# FOUNDRY

EST. 1902 TRADE JOURNAL

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. 99
No. 2042
Registered at the G.P.O. as a Newspaper

OCTOBER 20, 1955
Offices: John Adam House, John Adam St., London, W.C.2

Single Copy, 9d. By Post 11d. Annual Subscription, Home 40/-, Abroad 45/- (Prepaid)



UNIVERSITY OF MICHIGAN
NOV 18 1955
EAST ENGINEERING LIBRARY



**erling stamina in the steel**

ucing a moulding box which is stronger as well as lighter usual, and with such warp resistance as to make it the economical in use.
ng Moulding boxes are made from solid ribbed, rolled steel and to a special analysis having a carbon content to give maximum rigidity also a percentage of copper to ensure osion resistance.

*we send you our catalogue?*
Foundry Specialties Ltd. Bedford.

**BRIGHTSIDE HEATING & ENGINEERING CO. LTD. · SHEFFIELD**

*(A subsidiary of The Brightside Foundry & Engineering Co. Ltd.)*

and at BELFAST BIRMINGHAM BRADFORD BRISTOL EDINBURGH GLASGOW LIVERPOOL LONDON MANCHESTER NEWCASTLE PORTSMOUTH

BP47

FOUNDRY TRADE JOURNAL

Established 1902

Vol. 99 Thursday, October 20, 1955 No. 2042

*Editor:*
V. C. FAULKNER, F.R.S.A., HON.M.I.B.F.

*Assistant Editor:* A. R. PARKES, M.I.B.F.
*Commercial Editor:* P. E. CARDEN.
*Advertising Manager:* LENNOX HOLT, M.I.B.F.
*Production Manager:* R. J. LOVELL.
*Publisher:* H. J. DWYER.
*Circulation Manager:* E. T. GRIFFITHS.

*District Representatives:*
G. P. ELLIOTT (*Northern Area*)
T. H. SMITH (*Scotland*)

## PRINCIPAL CONTENTS

***Technical:*** PAGE

**Moulding in an Indian Foundry, by S. G. Athanikar:** Facilities at the foundries of the Indian Iron & Steel Company, Kulti, are reviewed, giving an insight into the procedures and methods adopted in the Indian foundry industry generally. Discussion on the Paper is included . . . . 431

**Recent Aluminium Casting Developments:** Introduction to the Paper by Mr. L. Fletcher and Report of the discussion when it was presented to the International Foundry Congress . . . . 439

**S.-g. Iron in South Africa** Comments on the production and application of this material in the Union, and typical castings made there. . . . 445

***Features:***

Leader: Foundry Dust Control and Ventilation . . . . . 429
New Equipment . . . . . 449
New Catalogues and House Organs . 453
New Patents . . . . . 453
Forthcoming Events (Advert. section) . 33

***Commercial:***

Imports and Exports of Iron and Steel . 450
Company News . . . . . 452
Contracts Open . . . . . 452
Raw Material Markets . . . . . 460
Current Prices of Iron, Steel and Non-ferrous Metals (Advert. section) . . 32

AN INDUSTRIAL NEWSPAPERS PUBLICATION

**Published Weekly**

*Single copy.: by post* 11d.:
*Annual subscription: home* 40s., *abroad* 45s. (*prepaid*).

**JOHN ADAM HOUSE, ADELPHI, LONDON, W.C.2**

*'Phone: TRAfalgar* 6171 (10 lines)
*'Grams: Zacatecas, Rand. London.*

# Foundry Dust Control and Ventilation

An extremely satisfying conference covering this subject was held in York at the end of last week. Organized by the British Steel Castings Research Association, it brought together a proper cross-section of the bodies concerned with or affected by the problems under discussion. The chairman of the Association, Mr. C. H. Kain, announced that no fewer than 75 per cent. of the member-firms were represented at the Conference. Trade union officials, foundry-equipment and ventilating engineers, research scientists from allied industries and finally, but of great significance, Her Majesty's Chief Factory Inspector, Sir George Barnett, and some senior members of his staff, made the complement. This permitted a proper presentation of the existing state of affairs—the problems and the plant and methods put forward for their solution.

It seemed that in no instance has one single piece of apparatus for dust exhausting been evolved which could immediately be standardized and adopted. In the case of stand grinders, there are two systems propounded—the Dusgard and the BSCRA model, while for pneumatic chipping tools there is the choice between the sleeved tools and the stonemason's glove. Presuming that the industry, and this includes ironfounding, was delaying installation of such plants until an authoritative lead could be given, Sir George was not keen on postponement of remedial measures, as the apparatus at present offered would materially improve conditions. He also referred to recent improvements in knock-outs, involving total enclosure, but these for jobbing shops would necessarily have a size limit imposed. Of great general interest was the observation made by Sir George on Regulation 7, in which appear what is generally known as " escape " clauses. We gathered that these would only be considered where the general ventilation of the shop was good. This general ventilation we deemed to be the part which is particularly awkward for founders. Only earlier in the week, we learned of the impossibility of the standardization of the heating and ventilating of a caravan in such a manner as to be certain of eliminating all possibility of fatal results arising from the operation of stoves and the like.

The success of any conference depends in no small measure on the lead given by the chairman. At York, the audience was splendidly served in this respect by Mr. R. F. Horton, Mr. D. W. L. Menzies, Mr. R. J. Richardson and Dr. R. J. Sarjant. They secured interesting contributions to the discussion from really knowledgeable people. From Mr. J. H. Wigglesworth, OBE, of the Iron, Steel, and Metal Dressers' Trade Society came the statement that with the introduction of the pneumatic chisel came an increased health hazard. He could without loss of force have extended his argument from the particular to the general and applied it to all mechanization of foundries.

## Mond Nickel Fellowships, 1955

The Mond Nickel Fellowships committee announces the following five awards for 1955:—

Mr. D. H. Butler (Phosphor Bronze Company, Limited)—To study the production of copper and its alloys, with particular attention to foundry methods, in the United Kingdom, on the continent of Europe, and in America. Mr. R. W. N. Dron (Rhoanglo Mine Services, Limited)—To study the organization of research and its relation to production in extraction metallurgy in the United Kingdom and North America. Mr. W. F. Duncan (British Aluminium Company, Limited)—To study the design, layout and operation of continuous strip mills, etc. Mr. R. H. Hannaford (British Iron and Steel Research Association)—To study organization and practice in the ferrous foundry industry in the United Kingdom, Europe, and the United States, with particular reference to layout, mechanization, and the application of management techniques. Mr. R. J. Harbord (John Lysaght's Scunthorpe Steelworks, Limited)—To study the development of continuous casting in the non-ferrous industry and its application to the production of steel.

## Iron and Steel Institute

*Autumn General Meeting*

The autumn general meeting of the Iron and Steel Institute will be held on Wednesday and Thursday, November 16 and 17, at the offices of the Institute, 4, Grosvenor Gardens, London, S.W.1 Members may bring guests, for whom no tickets will be required, and buffet luncheons (price 4s. 6d. per person per day) will be served in the library.

The following is a list of papers to be presented on the first day: "Furnace Scanning Periscope" (and film), by C. Burns; "Relative Merits of Low and High Sulphur Oil for O.H. Steelmaking," by C. A. Edwards; "Thermodynamics of Carbon Dissolved in Iron Alloys: Part I—Solubility of Carbon in Iron/Phosphorus, Iron/Silicon and Iron/Manganese Melts," by E. T. Turkdogan and L. E. Leake; Part 2—"Influence of Silicon on the Activity Coefficient of Carbon Dissolved in Molten Iron," by E. T. Turkdogan; Part 3—"Solubility of Carbon in Iron/Sulphur Melts," by E. T. Turkdogan and R. A. Hancock; Part 4—"Solubility of Carbon in Iron/Silicon/Phosphorus Melts," by E. T. Turkdogan and L. E. Leake; "Solubility of Nitrogen in Alpha-iron," by J. D. Fast and M. B. Veerijp; "Effect of Alloying Elements on the Solubility of Nitrogen in Iron: Part 1—Solubility of Nitrogen in Pure Iron and in 2.83 per cent. Silicon/Iron," by N. S. Corney and E. T. Turkdogan; Part 2—"Solubility of Nitrogen in Alpha-iron Containing up to 0.051 per cent. Vanadium," by E. T. Turkdogan, S. Ignatowicz and J. Pearson.

## *Congress Paper Author*

Mr. S. G. Athanikar, Author of the official Exchange Paper from the Institute of Indian Foundrymen—"Moulding in an Indian Foundry," printed on page 431 of this issue—was born and educated in the Bombay State and holds a diploma in foundrywork and metallurgy. He has several years' practical experience as a foundryman and is familiar with a wide range of casting production. He has visited foundries in the UK and studied modern production methods of some of the advanced foundries here. At present he holds a responsible position with the Indian Iron & Steel Company, Limited, Kulti, West Bengal, which is one of the largest groups of foundries in India.

*Delegates to the IBF National Works Visits at dinner on the evening of October 7, in the Grand Hotel, Bristol (top-table members and guests standing). The total assembled approached* 100; *near the centre (rear) is Mr. D. A. Richards, president of the Bristol & West of England branch of the Institute, who took the Chair, with Dr. A. B. Everest, the Institute's president, on his right.* (*See also page* 443 *of this issue.*)

# Moulding in an Indian Foundry*

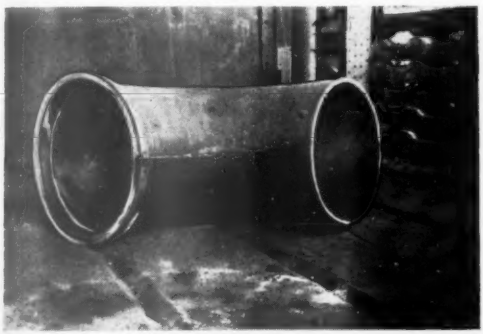
*By S. G. Athanikar*

*After first reviewing the scope and facilities at the foundries of the Indian Iron & Steel Company, Kulti, the Author gives in detail the procedures adopted for moulding four typical castings of the medium-to-large weight range. In this way, the versatility of the methods—loam moulding, core-assembly, and sectional-moulding—is developed. The descriptions reveal expedients adopted in the Indian foundry, which will be of value to practical foundrymen in other countries.*

In the India of to-day there are mechanized foundries, alloy-iron foundries and specialist foundries engaged in the manufacture of automobile castings, spun pipes, etc., which will bear favourable comparison with the best in Europe, but the vast majority of the foundries are jobbing shops, which have to be able to handle a wide variety of castings. Through the years, Indian craftsmen have built up a technique that has drawn forth favourable comment from foreign visitors.

*Official Exchange Paper from the Institute of Indian Foundrymen presented at the International Foundry Congress and fifty-second annual meeting of the Institute of British Foundrymen in London, last June.

FIG. 1.—*Ninety-degree bend for a 48-in. dia. pipe made in a loam mould.*



The insistent demand of the engineering industry for higher quality and lower prices has made it imperative for the successful foundryman to have an intimate knowledge of engineering and metallurgy as well as his own craft. Mechanized plants call for a high degree of engineering knowledge for their successful operation and the stringent demands of present-day specifications necessitate a metallurgical control that can only be achieved with an intimate knowledge of this subject. In modern foundries, the knowledge and application of these twin sciences is taken for granted, but in the hurry and rush of the foundry of to-day, the true craftsman will always find satisfaction in the execution of the "one-off" job, as this type of work is a challenge to his ingenuity and skill, if it is to be completed successfully and economically.

Mechanization has so simplified production that many jobs are now efficiently done by semi-skilled or even unskilled labour, but there still remains a valuable place for the skilled craftsman, and it is in the sure knowledge that this type of work will always be of interest to foundrymen that the Author has attempted to describe the manufacture of a few castings of this nature. The jobs dealt with are such as will be met with in most large jobbing foundries at some time or other and while a large variety of engineering castings are made in the Author's foundry those described have been chosen for their wide general interest.

The Author is connected with the Kulti works of the Indian Iron & Steel Company. These works include five ferrous foundries and one mechanized non-ferrous foundry with an aggregate output of

FIG. 2 (*a*) AND (*b*).—*Views of the strickle set-up for the pipe-bend casting.*

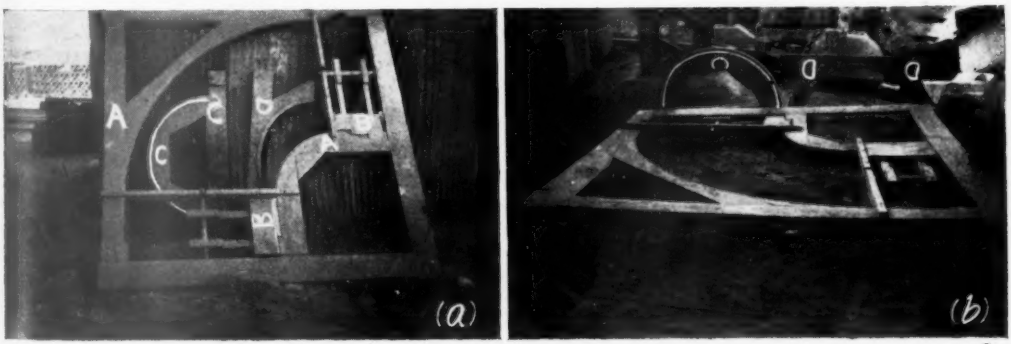


FIG. 3.—*Guide frame and strickles in position for forming the drag part.*

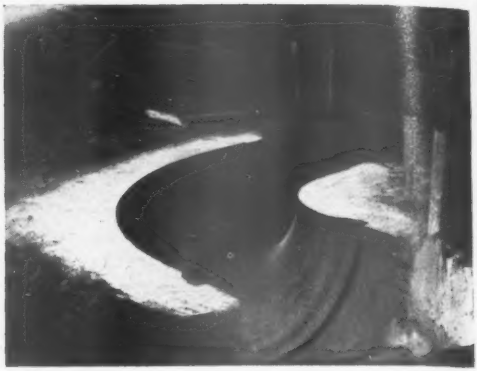


FIG. 4.—*Finished drag-part mould for the pipe bend.*

FIG. 5.—*Pipe-bend mould after application of a thickness layer to bring it to core size.*

over 7,000 tons per month and cover a wide range of specialized products. One of these ferrous foundries (and that of which the Author is manager) is known as the general castings shop. It is a triple-purpose shop, dealing with the production of repetition, semi-repetition and jobbing castings, varying in weight from a few ounces to 40 tons. The products include pipe specials and castings for steel and chemical works, marine engines, sugar-mill and general-engineering machinery. The main moulding is carried out in two large bays covering an area of 80,000 sq. ft. with proper lighting and ventilation and adequate overhead and jib cranes. The manufacture of light castings is done in an annexe having an area of 10,000 sq. ft. Castings from 10 to 15 tons are made in nine brick-and-concrete pits. Moulds for large repeat jobs are made on two 10-ton jolters. Treated moulding sand is made available from a modern sand plant and the moulds and cores are dried in a battery of stoves which are fired by underfeed stokers and are provided with thermostatic controls. Portable mould-driers are used for pit-moulded jobs. The melting of iron is carried out in two balanced-blast cupolas of 14 tons per hour capacity each. The services of a modern laboratory are available to ensure control at every stage. A large wood-and-metal pattern-shop caters for the needs of this and the other foundries.

**Bend for 48-in. Pipe**

Fig. 1 shows a finished 90 deg. bend for a 48-in. dia. pipe of the socket and spigot type. The casting was made in loam by frame-sweep process; the drag being built in a pit and the cope in a box part. The strickle set-up is shown in Fig. 2 (a) and (b); A is the main guide frame, B and B′ are the sweeps for the socket and spigot portions, C is the strickle for the mould and D is the strickle for the top-half core. The sweeps B and B′ and the strickle C had loose thicknessing strips (shown in white lines in Fig. 2(a)) screwed against their operating faces. These strips were removed after making the mould and the strickles were then re-operated against the same guide frame for thicknessing the mould to the

FIG. 6.—*Self-balancing core-iron for the pipe-bend core.*

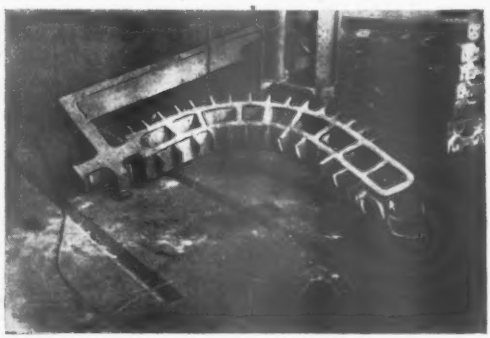


FIG. 7.—*Dummy core-box with core-iron in position.*

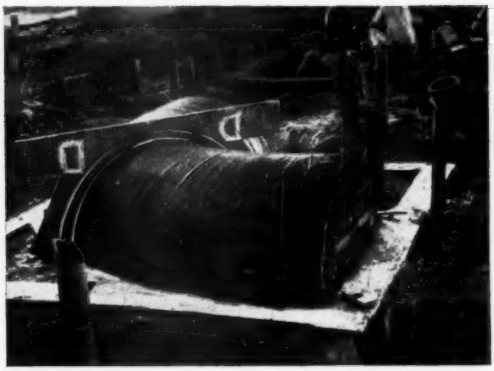


FIG. 8.—*Forming the top-half of the core, using strickle D.*

core size. The following was the sequence of operations :—

The guide frame, with sweeps and strickles in position was laid out on suitable supports and the drag was built up in the usual way as shown in Fig. 3. Care was taken to keep the brickwork 1-in. clear of the sweeps and strickles. The brickwork was afterwards clay-washed and the mould finished in loam as shown in Fig. 4. The finished mould, after it had partly dried, was coated with parting paste. A layer of moulding sand about $1\frac{1}{2}$-in. thick was then rammed over the parting paste and the mould was then swept to core size with the same sweeps B—B′ and the strickle C, the thicknessing strips in this case having been removed. Fig. 5 shows the mould thicknessed to the core size. Upon this basis the core was built in brick and loam on a heavy type self-balancing core-iron, the details of which are shown in Fig. 6. Its use completely eliminated the necessity of chaplets for core supports. It is unnecessary to point out the advantage of such a core-iron, as foundrymen are fully aware of the risks involved in the use of chaplets in making pressure-resisting pipes. The further advantage in using this type of core-iron was that it could be used repeatedly. Fig. 7 shows the dummy core-box with the core-iron in position. The bottom-half of the core was built and the necessary provision was made for contraction and venting, and the top-half of the core likewise was built up on the bottom-half in brick and swept in loam (with strickle D) as shown in Fig. 8. The core thus completed was lifted off the mould, finished, black-washed, dried and made ready for use as shown in Fig. 9. The thicknessing from the drag was then taken off and the mould finished in the usual way. The cope part was similarly built in brick and loam in a box part with the same pattern set up as shown in Fig. 10. All the other operations, such as finishing, black-washing, drying, etc., were next carried out in the usual way; the dried cope was then inverted accurately over the drag and the mould was thoroughly inspected. After the foundrymen were

FIG. 9.—*Pipe-bend core as finished and made ready for use.*

satisfied, registration marks were put on the outside of the mould at three or four places. The mould was then parted for coring up, etc. Fig. 11 shows the drag part with the core in position. The mould, along with its cope was thereafter made ready for

FIG. 10.—*Pattern set-up for making the top-half of the pipe-bend in a moulding box.*

FIG. 11.—*Drag part of the pipe-bend mould with its core in position, prior to final closing.*

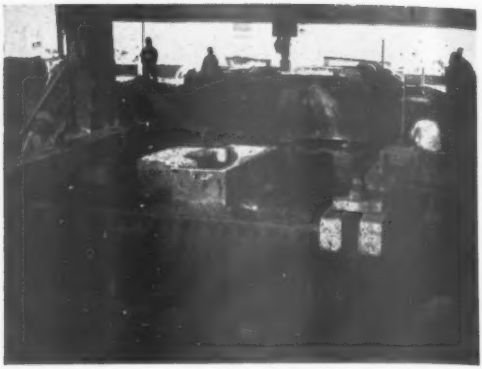
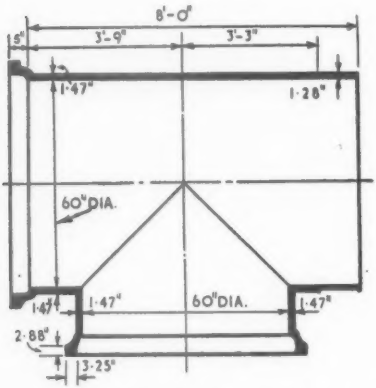


FIG. 12.—*Pipe-bend mould made ready for pouring, with pouring basin, tie-bolts, etc., in position.*



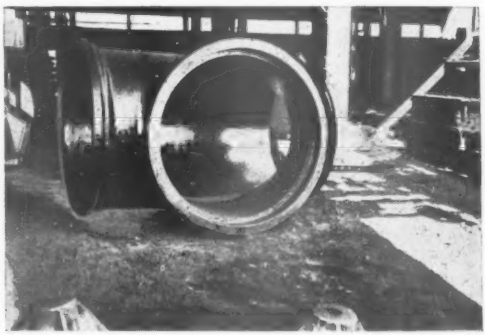
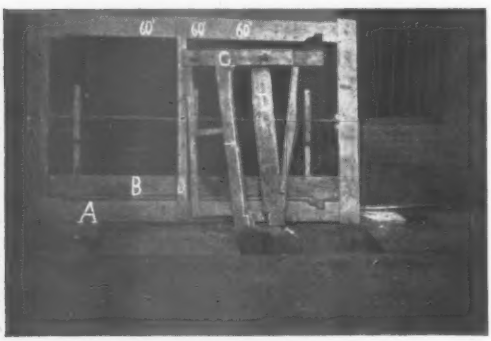



FIG. 13 (*a*) AND (*b*).—*T-pipe, 60 in. dia., made on similar lines to the pipe-bend.*

FIG. 14.—*Simple and inexpensive pattern set-up for making the 60-in. dia. T-pipe.*




pouring, and the holding-down bolts and the pouring basin were placed in position as shown in Fig. 12.

The manufacture of a few more such castings, from the same set-up was a very simple affair. The brickwork, both from the drag- and the cope-part remained almost undisturbed even after taking out the casting. It was only necessary to strip off the burnt loam from the face of the brickwork and re-sweep the drag and cope parts with fresh loam. All the operations described for core making had to be repeated, but the same iron was used.

Fig. 13 (*a*) and (*b*) show a T-pipe, 60 in. dia., of the spigot and socket type. It was manufactured on lines similar to the pipe bend described earlier. The mould was made in loam, the cope being swept in a box-part and the drag in a pit. The simple and inexpensive pattern set-up used is shown in Fig. 14. A is the main guide frame, B the sweep for the

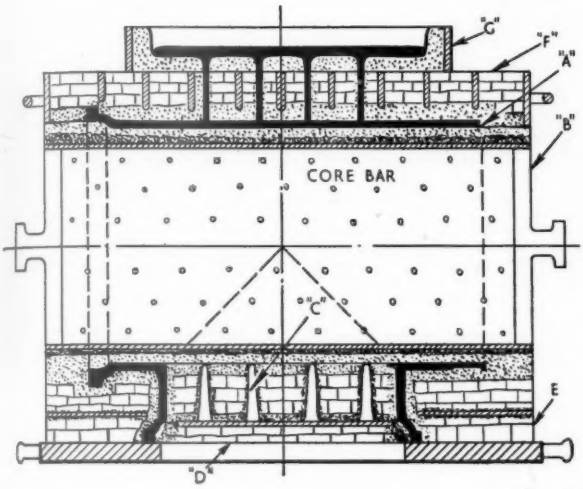
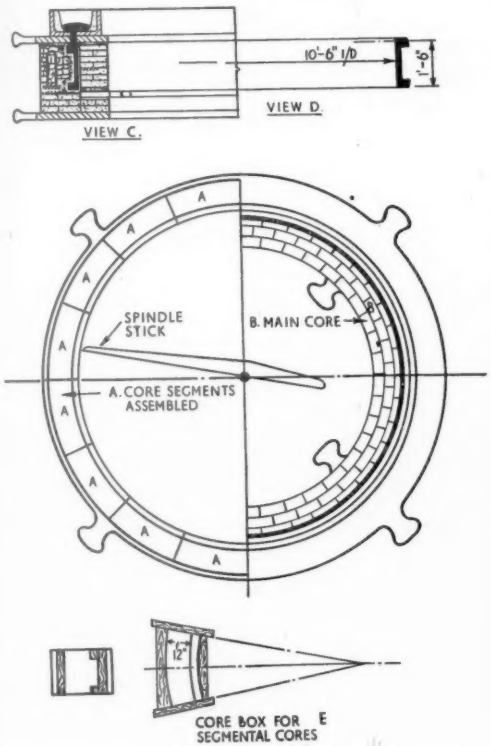



FIG. 15.—*Imaginary section through the cast mould for the 60-in. T-pipe, showing details of the mould and core.*

A—60-in. dia. T-pipe; B—main core; C′—branch core, top-half; D—branch core for socket portion; E—parting ring around the socket; F—top box-part, and G—pouring basin.

FIG. 16 (*below*).—*Flanged ring:—C—Section through the mould ready for pouring; and D—detail of the finished casting, which was 10 ft. 6 in. dia. and 1 ft. 6 in. high.*




mould and C and D the sweeps for the branch core and mould. An imaginary section through the cast mould is shown in Fig. 15. But for the branch portion, the casting might be considered to be almost a straight pipe and the moulding operation does not materially differ from the pipe bend already described. One half-portion of the straight pipe was swept in the cope-part against the frame A, with sweep B. The other half-portion of the straight pipe together with the branch mould and core was swept in the drag. The mould for the socket portion of the branch, shown at E in Fig. 15, was first swept on a cast-iron ring, with the sweep C operating against a spindle, and was then transported to a stove, where it was finished, black-washed and dried. The branch core was then swept on the same spindle with the sweep D and also the frame sweeps A and B. The straight portion of the core, which was built on a parting plate (shown at C′ in Fig. 15), was lifted off for finishing and drying and also to facilitate the rest of the moulding operation. Part D of the branch core was finished and dried in position. The branch-socket mould, finished and dried, was placed back in the position at which it was swept. The rest of the moulding operation was completed with sweeps C and B and the mould was later finished off and dried. The branch core C′ was then placed back to its original position. The main core, D, which was swept on a cast-iron core bar in the usual way, was placed in the mould and the cope lowered over it. The mould was thus made ready for pouring as shown in the cross-sectional view.

FIG. 17.—*Hydraulic-ram casting, 23 ft. 8½ in. long, 19-in. o.d. and 12-in. bore.*

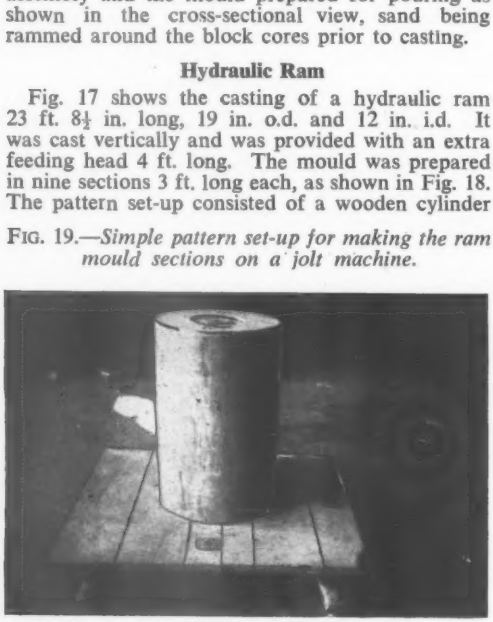
FIG. 18.—*Mould sections, 3 ft. deep, for the ram casting shown in Fig. 17.*

The view D in Fig. 16 shows a cast-iron flanged ring 10 ft. 6 in. dia. and 1 ft. 6 in. in height. Twelve of these castings were very urgently required. The moulds were made by core-assembly methods and cast at the rate of one a day. The pattern set-up for this work was extremely simple and principally consisted of a corebox (shown at E in Fig. 16). A section through the completed mould ready for pouring is shown in view C. The cope was made by assembling 16 block cores made from the corebox referred to, the drag being swept in the usual way in brick and loam on a lifting plate and dried over-night in a core-stove. The segmental cores were assembled together against a spindle stick as shown in the plan view. The main core was then lowered centrally into the assembly and the mould prepared for pouring as shown in the cross-sectional view, sand being rammed around the block cores prior to casting.

### Hydraulic Ram

Fig. 17 shows the casting of a hydraulic ram 23 ft. 8½ in. long, 19 in. o.d. and 12 in. i.d. It was cast vertically and was provided with an extra feeding head 4 ft. long. The mould was prepared in nine sections 3 ft. long each, as shown in Fig. 18. The pattern set-up consisted of a wooden cylinder

FIG. 19.—*Simple pattern set-up for making the ram mould sections on a jolt machine.*



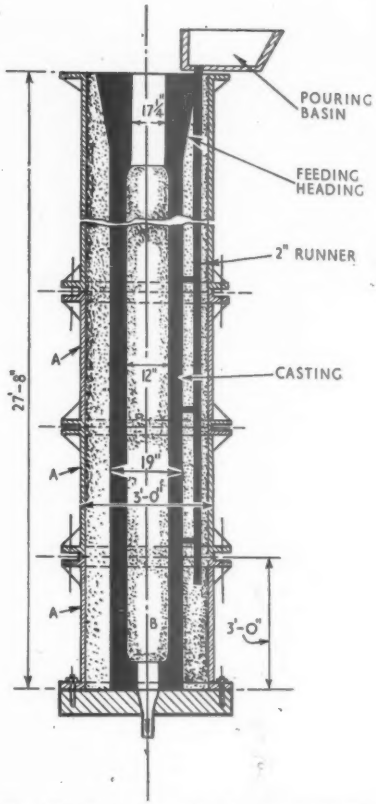



FIG. 20.—*Section through the ram mould, cored ready for pouring; A—mould sections; and B—core.*

3 ft. long and a ramming board (as shown in Fig. 19) fixed on to a jolter table. Moulding boxes which were faced and jig-drilled were jolt moulded, finished-off, black-washed and dried in the usual way. The central core was swept on a cast-iron core-bar. The mould thus made in sections was then assembled in a special pit; the core was located centrally and the whole assembly made ready for pouring, as shown in cross-section in Fig. 20.

The Author wishes to tender his grateful thanks to the management of the Indian Iron & Steel Company for permission to submit this Paper and the photographs and sketches accompanying it. His thanks are also due to colleagues for helpful suggestions.

## DISCUSSION

[At the London International Foundry Congress, this Paper was presented by Mr. J. Blakiston in the absence of the Author, with Dr. A. B. Everest, president of the Institute, in the Chair.]

Opening the discussion, MR. BLAKISTON gave a brief resumé of the history of founding in India,

which, he said, was considered by many, historically speaking, as the original home of iron manufacture. This art drifted westward and had now again returned to India in a modern form. One of the earliest iron foundries in India was that established by Colonel Swinton in the year 1781 at Howrah (Calcutta). This works was still in operation under the name of Burn & Company Limited, and to-day represented one of the most up-to-date and versatile mechanized foundries in Asia.

At the turn of the century, large-scale pig-iron manufacture from the rich ore-deposits had become an established fact and as was the case when all large agrarian countries were developed, railway plant and pipe-manufacture became, and still was, one of the major manufactures. In the early 1920's, Mr. Blakiston continued, a past-president of the Institute, Mr. John Cameron, J.P., had brought into operation a large, light iron castings foundry engaged on the manufacture of rainwater goods and similar components. Since the granting of independence to India, technical development had advanced at an accelerating rate and as in most cases of new industrial expansion, not perhaps entirely following the hopes of the optimists. However, from the speaker's personal observations, the pessimists had been confounded, and the progress of industrial development had been remarkable, particularly as a new generation of young Indians was now entering into the industrial field with a better conception of the dignity of labour.

MR. A. J. SHORE said he was particularly interested in the reference to thin castings, especially as various committees had debated how thin a casting could be, and he had been wondering whether the moulds were dried or whether cast "green," and if the resulting casting was particularly brittle. In other words, what was the minimum thickness of casting?

There was a wide field of application if founders could make sure that they were able to get grey-iron castings that were really thin. As he went around the country, some founders talked of thin castings, meaning about $\frac{1}{4}$-in. section and thought that anything below that would be chilled and unusable. He had made castings $\frac{1}{16}$ in. thick green-sand, but they were not grey; on the other hand, there were obviously parts of the world where, as Mr. Blakiston had said, very thin castings had been used for years, and it would be very interesting to hear something about them.

### Making Cast Bowls

MR. BLAKISTON, in reply, said he would have to go back into history a little. Several hundred years ago, the original method of manufacturing the rice bowl was to make the shape in wax, get a mixture of riverside clay and sand mixed with ox dung, surround the wax vessel with that particular mixture, cut a groove around the top, in the groove insert small pieces of metal, and then light a bonfire of open-cast coal around the whole, and after the fire had died down one broke it away and there was produced a quite tough, grey-iron, thin-section casting. As would be appreciated, the mould was thoroughly dried—it had to be, to melt the wax out—and as the fires died down the casting was in fact, annealed.

The present practice in the cottage industries was to use a green-sand mould, and fortunately the sands used "green" in India were river sands and were very permeable. The founders could literally get away with extremes of practice on account of the high permeability of the sand. In many cases, water was allowed to percolate into a mould without serious results, and whereas in this country, with heavily-bonded sands, such treatment would result in an explosion, in India the metal ran into undried moulds quite quietly.

Indian irons were very rich irons; very little scrap was used. When using Indian pig-iron, or if scrap had been produced from Indian iron, one got very little chilling at all. Originally, the phosphorus content inherent in the pig was raised slightly by additions of phosphate rock in the older type of blast-furnace or even in the cupola, but sometimes it was found that the person responsible had forgotten to put the phosphate rock in and it appeared to make no difference at all. In some cases, the low blast-pressures used in the cupolas could account for a high carbon-pick-up and absence of chilling.

One of the difficulties associated with Indian-made rainwater pipes was lack of brittleness. In the United Kingdom, when one bought what were known as "builder's castings" the man installing them expected to be able to give the pipe a tap with his trowel for it to break where it had been hit, but unfortunately Indian-made rainwater pipes were tough and one could not snap them with the blow of a trowel, they had to be cut with a hacksaw.

### Core Buoyancy

MR. H. HAYNES congratulated the Indian foundrymen, who had undoubtedly done a skilled job of work with the items described. One question concerned Fig. 6, where there was shown a self-balancing core-iron for the pipe-bend core. That feature was probably the most important part of making that casting, because the Author had described making that large pipe without any studs or anything in the mould. It would be interesting to know whether he had designed that core-iron as a result of experience or whether he had used some formula linked to the bouyancy of the core in the mould.

MR. BLAKISTON said the original experience for that particular core-iron would be inherited some years ago from a pipe-moulding foreman from the United Kingdom, and he could practically name his works—either the old Cochrane works on the North-East coast or the old Stanton works, and most probably the former—and once a method had been established in most oriental countries, the operators were extremely conservative and would not deviate from it. Jobs were tackled in the traditional manner, which had been handed down over the years.

MR. H. T. CREYDT (South Africa) asked whether there was any roll foundry in India at the present time.

MR. BLAKISTON said a roll foundry had been built at Tatanagar but he was not sure whether it was in full operation yet. Some rolls were presently

*(Continued on page 438)*

# Foundry Industry in France

(*From a Paris Correspondent*)

From a table, presumably giving, *inter alia*, annual outputs, included in an article received from a Paris correspondent, it appears that in France no fewer than 1,700,000 stove grates and cookers were to be taken out of commission and that some 3,000,000 are still needed. The production is of the order 800,000 solid-fuel-burning stoves and 550,000 gas-fired. About 50,000 castings are made in connection with central heating, of which 20 per cent. are exported. The laundry industry takes more than 9,000 *tonnes* of castings, of which one third is exported. France uses about 100,000 *tonnes* of cast-iron pipe and exports 66,000 *tonnes*.

There are now in active operation in France 2,140 foundries, producing 1,300,000 *tonnes* and employing 93,000 people. These are subdivisible into 55,000 labourers, 27,000 skilled men, 7,000 office staff, and 4,000 trainees. There are 725 concerns employing fewer than five men; 401 have between 21 and 50; 23 between 501 and 1,000; and six between 1,001 and 2,000. About 77 per cent. of the industry is concentrated in the East, North, and the Paris and Lyons districts, the balance being scattered throughout France and French North Africa.

The following are typical of French production expressed per man/month:—Jobbing shops, 30 cwt.; steel castings, 24 to 30 cwt.; cast-iron pipe, 25 *tonnes*; and non-ferrous, 20 cwt.

## Exports

The writer, whilst aware that productivity does not compare favourably with American conditions, does believe that where adequately equipped the French foundry industry is similar, if not superior, to other countries, and this especially applies to the cast-iron pipe section, which exports approx. half its output to about 30 countries. Enamelled baths are exported to the extent of 4,300 *tonnes*, of value in the region of £425,000. In connection with central heating, about 30 per cent. is exported—that is, 4,300 *tonnes* of a value of about £825,000—whilst the export of domestic heating and cooking apparatus runs to 6,700 *tonnes*, representing £1,500,000. Rolls for steelworks are sent abroad to the extent of 500 to 1,000 *tonnes* a year. Bronze bells find a ready market in Canada.

---

## *Moulding in an Indian Foundry—Discussion*

(*Continued from page 437*)

being made in India but so far no high-quality alloy rolls, as such were understood in this country, were made in India. There was still a considerable local demand for sugar rolls and although these used to be made in large numbers in the Bengal area, the manufacture of sugar rolls now seemed to have been drifting to Madras and the Southern-India area.

On the motion of the CHAIRMAN (Dr. Everest) a very hearty vote of thanks was accorded to the Author, Mr. Athanikar, and to Mr. Blakiston for his very interesting summary of the Paper coupled with a general review of the position in India.

# Investment Castings

Writing in the September issue of *Precision Metal Molding* and using the rather lengthy title "These Basic Suggestions Will Help You When You Buy Investment Castings," the author, Mr. Charles T. Sloan, has included the following tips for designers:

(1) Avoid blind holes wherever possible; blind holes are much more difficult to cast and, of necessity, will add to the cost.

(2) It is not advisable to specify cast threads. These can be produced more economically as a secondary operation.

(3) Try to maintain uniform wall thicknesses around the entire casting. This aids in producing a sounder finished part.

(4) In round or flat pieces, always allow for machining where fits are required.

(5) Incorporate ribs in casting design wherever possible; these help in obtaining a sounder casting.

(6) Investigate the possibility of combining several components into one casting. This affords a better integrated unit, minimizes final machining and subsequent assembly operations.

(7) Do not specify closer tolerances than are necessary because this makes the part more expensive and often delays delivery.

(8) Indicate general tolerances on unimportant dimensions; specify close tolerances only on the essential dimensions.

(9) Specify surface finish only where really needed.

(10) Indicate where machining is allowed and how much. This allows the producer to make a casting with sufficient machining stock.

(11) In determining the final tolerances, where close tolerances are desired, it is best to consult with the producer to arrive at an understanding. Sometimes, a rearrangement of the dimensions makes possible a better casting.

(12) The producer should be given as much information as possible, about the end-use of the product. This enables him to study all aspects governing the part's expected performance, and to call on his past experience with similar castings.

---

# Provision of Towels

The text of an agreement, signed by the Engineering and Allied Employers' National Federation, the National Light Castings Ironfounders' Federation and the foundry Unions affiliated to the Confederation of Shipbuilding and Engineering Unions, is given below:—

1. Except in those cases where mutually satisfactory alternative arrangements exist, the employer shall supply on request a clean and suitable towel to any foundry worker for the use of the worker in connection with the bathing facilities provided under the Iron and Steel Foundries Regulations, 1953, subject to the payment by the worker of an appropriate deposit.

2. At mutually agreed intervals of not more than one week, the employer will supply the worker with a clean towel in exchange for a used towel returned by the worker in reasonable condition.

3. Any worker who upon requiring a clean towel fails to return in reasonable condition a towel previously supplied to him, shall be required to pay the cost of replacing the towel he has failed to return, and the deposit already paid by him shall be deemed to relate to the clean towel supplied in accordance with this clause.

# Recent Aluminium Casting Developments*

## *Introduction and Discussion of Mr. L. Fletcher's Congress Paper*

### Introduction

MR. L. FLETCHER, in introducing his Paper on "Recent Aluminium Casting Developments" at the International Foundry Congress, said the object of the Light Metal Founders' Association in sponsoring this Paper was not to give a highly technical description of modern metallurgical or foundry practices but to convey an indication of the rapid growth of the industry over the last ten years. The Paper gave details of several outstanding applications, all of which had been "won" from what have been termed traditional materials. In some cases, aluminium had replaced conventional materials completely, while in others it was in direct competition and gaining ground rapidly. Cast iron, malleable-steel, timber, copper, lead and zinc were all being affected by the growing recognition of the many advantages of using aluminium castings, *i.e.*, weight saving, resistance to corrosion, good surface-finish, ease of machining, and uniform and economic methods of production, particularly when using the gravity- or pressure-die-casting processes. These attractions, offered by an industry which was still comparatively young and modern in its outlook and ideas and backed by a supply of raw materials relatively stable in price had played an important part in an industry that has practically doubled its output since the end of world war II.

In a previous Paper presented to this Institute, it was pointed out that the wide choice of alloys at the founder's disposal to-day (compared with the one or two available to his predecessor of, say, 40 years ago) involved him in a wider knowledge of his alloys, of their suitability for production by different methods, and of their fitness for the customer's requirements. One of the engineering industry's constant objectives was the simplification of its methods of production, and the most economic and flexible method for forming metals was by pouring molten metal into a refractory cavity of the desired shape. Because of this, the founder was constantly being asked to produce castings of more uniform properties, with smoother surface-finish, and to greater dimensional accuracy. These requirements had had to be met by the development of new casting techniques such as the plaster-mould processes, shell moulding, etc., and to-day designers were co-operating more and more with the founder when preparing drawings for new projects, because they realized that the success of the end-product depended largely upon this shared responsibility.

### Advanced Materials and Techniques

Advances in foundry techniques as applied to aluminium castings were reflected in the size of castings which could now be successfully produced —this had increased considerably over the last five years. Complementary to this, the development of alloys with especially good casting characteristics—fluidity, less susceptibility to hot-tearing and to internal and surface shrinkage defects, and so on—had widened the field for castings of all sizes and types, simple and complex, whether produced by sand, gravity- or pressure-die casting, or by one of the more recent processes developed to solve particular problems.

The Paper included a brief description of the characteristics of a high-strength aluminium casting-alloy (B.S. 1490-L.M. 10-W) which had come into prominence during recent years, principally from its applications in the aircraft industry during the second world war, and was now in general use over a wide range of production. This alloy, of the aluminium/magnesium group, contained between 9.5 and 11.0 per cent. magnesium. It combined high proof-stress with exceptional resistance to both shock and corrosion, and had been used for many highly-stressed parts previously produced in malleable iron. The development of gravity-die-casting of this alloy had enabled a considerable reduction in weight to be made in many jobs without sacrificing mechanical properties. It had also proved of great economic value in that castings in this alloy could be machined with greater rapidity than malleable iron.

### Examples

In addition to the development of casting alloys and foundry techniques, Mr. Fletcher continued by saying that marked progress had been made in the welding of aluminium by the argon-arc process. The suitability of the majority of aluminium casting alloys for welding facilitated the rapid, accurate and strong assembly of relatively small cast subcomponents into a complex and often bulky product which would otherwise be difficult or impossible to cast in one piece or to join by any other method. It was reasonable to say that the immense possibilities for this form of assembly were only now being realized.

As the flexibility of the gravity-die-casting process was emphasized, it was pertinent to mention the advantages of this method in producing a very wide range of components to close dimensional tolerances and also, because of the frequency with which they were incorporated in a design, to note the facility of this method for coring small holes. When these advantages were coupled with the lower melting temperature of aluminium, which meant lower fuel costs, and consequent comparative freedom from refractory troubles, the user could be satisfied that his article had been produced under the most economic conditions. For instance, the textile industry was being almost re-equipped with such items as aluminium-alloy bobbins and spindles,

* Paper printed in the JOURNAL, August 4

which were replacing the conventional wooden ones. Here, the advantage of durability, adaptability, higher working speeds and versatility of the metal, were keenly appreciated. The ability to colour anodize aluminium facilitated easy reference to the type of yarn or process to which the material was subjected.

### Industries Served

Aluminium had met with considerable success in the electrical industry, mainly at the expense of cast iron, for such components as casings and some parts of contactor mechanisms, where the advantage of corrosion resistance implied the reduced necessity for surface treatment. The dairy industry took full advantage of the hygienic quality and the ability of aluminium to take a high polish. In this field, it competed with stainless steel, and its high resistance to corrosion obviated the necessity for protective surface-treatment. Light alloy castings were to be found in ships of all types; in the radar scanning units, radio equipment, switchgear housings and a host of other useful applications.

Perhaps the most striking evidence of the spread of light alloys into the consumer field was seen in the home, where a whole range of aluminium products had become so much a part of everyday life, that they were taken for granted. In the last paragraph of the Paper, a comparison was made between the peak war-time production of the aluminium cast-industry and the current output and these figures amply illustrated that the engineer of to-day fully recognized the advantages of using aluminium castings. However, there was still a vast potential market before the industry. The need to conserve the heavier metals which would become more apparent in the years ahead, coupled with the ease and adaptability by which automation could be applied both to the gravity- and pressure-die-casting processes would give further impetus to the growth of the light-alloy casting industry.

## DISCUSSION

MR. J. B. MCINTYRE asked Mr. Fletcher whether he often had to examine closely the possibility of shell moulding competing with die-casting in the aluminium foundry business. Also, could he say in just how many cases over, say, the past five years, had light alloys taken work from ferrous founders?

MR. FLETCHER, in reply, said shell moulding in the light-alloy industry had not made as much progress as other sections of the foundry industry. Much progress had, of course, been made in shell coremaking, particularly when applied to gravity-die-castings where one looked for better internal surface finish and dimensional accuracy, but he thought the industry had mixed feelings about adopting shell moulding. Certain alloys where the maximum chilling effect was required, such as LM10, were not too successful in shell moulding. The second question was rather difficult to answer and possibly he could just say "thousands," although he was not quite sure what Mr. McIntyre had in mind: Quite a few illustrations had been given and it would be possible to give many more but obviously it had been necessary to limit the length of the Paper.

MR. MCINTYRE said he had in mind the prospect of a paper which he had to give in the near future concerning the state of the industry with regard to ferrous and non-ferrous production.

MR. FLETCHER said that was fairly easily answered because the latest statistics which he had seen regarding iron castings production in this country put it in the neighbourhood of four million tons per annum whereas in the Paper he had mentioned that the light-alloy casting industry was running at the rate of 90,000 tons per annum. In fact, that figure was just a little out of date because the output was now around 100,000 tons per annum but there was a long way to go before the impact of the aluminium castings industry was felt very heavily by ironfounders.

### Shell Processes for Light Alloys

MR. D. F. BAILEY said, generally speaking, shell moulding did not tend to oust die-casting in the aluminium field, and he would recommend it only for suitable castings where the quantity was not sufficient to justify die costs, whatever number that might be. In other words, if a customer did not want to be involved with a high die cost and the numbers off were fairly low, then shell moulding might be economical, but if a very long run was envisaged, die-castings were the most economical, as one did not have the extra cost each time of an expendable mould. Shell cores, however, had proved to be very useful to the gravity-die-casting industry.

With regard to LM.10 alloy, Mr. Bailey said he had rather mixed feelings about it for shell moulding: some people reported that they found it much easier to make good castings and get them through an X-ray examination successfully by using shell moulds or cores, whilst others did not, so presumably only time would tell. His personal opinion was that some of the failures were due to aspects of metallurgical technique as this particularly difficult alloy required much metallurgical "know-how" and some failures were attributed to unbacked moulds levelling out the temperature gradient and making feeding difficult. This latter condition could technically be corrected by using thin shells of the order of $\frac{1}{4}$ in. and backing with shot.

MR. FLETCHER agreed that much more work was necesary; so far he believed experience had indicated that inferior mechanical properties were shown with LM10 alloy. On the first point, he completely agreed with all that Mr. Bailey had said: for a small quantity, shell moulding showed advantages, but for large quantities, die-casting was to be preferred.

### Plaster Moulding

MR. P. M. JURSS (Australia) asked to what extent plaster moulds were used in this country for making aluminium castings. He had noticed that the Author went to some trouble to explain the making of a tyre mould and it would be interesting to know if that method was very extensively used in this country.

MR. FLETCHER replied that he was unable to quote any figures but thought only a very small proportion

of the aluminium casting output of this country was produced from plaster moulds. Some 60 per cent. of it was produced by either pressure-die-casting or gravity die-casting. He himself was not too familiar with plaster moulding; the example mentioned in the Paper was a contribution by one of the members of the technical committee, and as that member was present he might be able to reply.

MR. REID said possibly the best way to answer the question regarding plaster moulding was to say it had very specialized application. It was a rather costly process and was normally only used where the money spent on equipment and on the materials used in the process would be well justified. In the particular case of the tyre mould illustrated in the Paper, one could visualize that the normal method of making such a tyre mould used to be to machine from, or build-up on, a cast-iron blank, but the development of more-complex tyre treads nowadays, with a view to damping out resonance and giving a better grip on the road—a subject upon which he was not qualified to speak—had rather helped the plaster side of aluminium foundry practice to take on work of that nature. The method was extremely flexible; it was capable of producing castings which it was impossible to cast by any other method, even by investment moulding, but these remarks only applied to specific cases where extremely high degrees of accuracy and finish were desired and had to be maintained at all costs.

MR. JURSS asked whether in fact that was an experimental tyre mould or whether the method was being used very extensively.

MR. REID replied that it was not an experimental job: his company had now made many hundreds of such moulds and it was quite a standard production item.

MR. FRANK HUDSON said the plaster method of producing castings was extending quite rapidly in the aluminium-alloy field with particular reference to the production of aluminium-alloy, matchplates for bronze and iron foundries. This was beginning to absorb quite an appreciable tonnage of aluminium alloys and he believed it would grow quite rapidly.

### Service Qualities

MR. T. H. WEAVER said he was very interested in the Paper, which had been extremely well prepared, but there was one particular point about which he would welcome some information and that was with regard to the brackets for which the Author claimed to be using LM4 alloy. Were they X-rayed or not? Was there any disintegration of the casting through vibration during service, or variation of the temperature during the melt? Were they re-heat-treated after they had been in service for a certain length of time? It would be very interesting to know how well these components behaved in service.

MR. FLETCHER said he could speak with authority on that subject because the item was produced by his own company: such brackets had been in regular production and service now for nearly four years; the quantities produced probably ran into tens of thousands and they were standard equipment on one particular truck body. The bearer bracket, as it was called, was not an easy job, and needed careful supervision in the foundry. His company used X-ray solely for control, and not as a standard method of inspection. A number of brackets were X-rayed periodically, they were given a normalizing heat-treatment and they were quite stable after that, and he had not heard of any complaints of distortion in service.

Obviously there had been teething troubles with the job, but once the design had been standardized, it had given perfectly satisfactory service ever since. It had come about in the first place because there was a shortage of good quality timber at the time: timber was now fairly plentiful, but the foundrymen still held the job.

MR. WEAVER further asked whether it was the custom to cast a test-bar with each cast of the brackets, one at the beginning of the set of castings and one at the end, because to his mind that would be entailed for efficient control with such a job.

MR. FLETCHER, in reply, said the particular job, of course, did not come under any A.I.D. inspection but it did come under the firm's normal foundry control organization where they took test-bars and analyses of all melts, that being standard practice in the foundry.

### Shell Moulding *v.* Die-casting

PROFESSOR OVE HOFF (Denmark), referring to the subject of shell moulding and die-casting, said generally speaking from his own personal experience he had found that the two processes could not be compared. The latter was sand moulding and could only be compared with sand moulding because it gave mechanical properties in the casting which were very different from those which could be obtained in a permanent metallic mould, due to the cooling rate. He believed the two methods could only be compared when one was heat-treating castings after the casting process, as one would always get comparatively poorer mechanical properties as a result of the fact that the shell-moulded castings were cooling slower than an ordinary casting.

With regard to tyre moulds, Professor Hoff said two years ago he had visited a small foundry in Cleveland where they were making nothing but tyre moulds in plaster, and in that foundry they were making one or two dozen castings per day.

MR. BAILEY said the previous speaker's remarks on shell moulding were correct provided that they were qualified by saying they referred to casting in an unbacked shell mould, the cooling rate of which was then slower than that of a conventional sand mould, let alone that of a die. The work of Morey, Bishop and Pellini* had shown quite conclusively that unbacked shell moulds had a much slower cooling rate than sand moulds, but thin moulds—in the region of $\frac{1}{4}$ in. thick—when backed with shot had a cooling rate which could be said to be similar to a die. The speaker's practical experiences were in agreement with those findings. He personally

* (*American Foundryman*, 1954, **25**, No. 4, p. 46)

G.

felt that light-alloy founders were overlooking this very important factor, as the faster cooling rate of thin, backed shells could be extremely useful in certain cases when making expensive, high-quality castings such as were required by the aircraft industry. The money saved on making thinner shell moulds, by virtue of lowered material cost and shorter production time, would go a long way to offset the extra cost of backing with shot. The cost of X-ray and other quality controls was extremely expensive and represented frequently a greater cost than the actual producing of the casting, so even a small reduction of rejected items at this stage could more than outweigh the cost of backing.

MR. WEAVER said it should be appreciated that the thinner the shell one made the more it cost.

### Aircraft Castings

A MEMBER, referring to Mr. Bailey's remarks, said he had obviously not met the aircraft designers when he considered making castings of aluminium in shell moulds. If he had seen some of the complicated jobs which his own company had made as sand castings, he would think twice about making aluminium castings in thin shell moulds.

MR. BAILEY replied that he had actually worked in the aircraft industry and there was a certain amount of truth in the last speaker's remarks.

DR. E. SCHEUER (International Alloys, Limited) said he could not persuade himself into believing that shot backing a shell mould was really a very effective means of increasing the cooling rate.

MR. BAILEY said he could only refer Dr. Scheuer to the work of the three American authors which had been reported fully and which was based on work on copper-alloys.

### "Castability" of LM10 Alloy

MR. T. KROGVIG (Norway) asked whether the alloy LM10 was used only when there was a need for an alloy with high mechanical properties or when it was combined with a need for good corrosion resistance.

MR. FLETCHER, replying, said the alloy's main attraction was the high mechanical properties, particularly resistance to shock, but apart from the need for mechanical properties and resistance to corrosion which was outstanding over the whole of the range of aluminium casting alloys, the alloy had one disadvantage, namely that it was not very good in pressure-tightness—in fact, it was bad. Its merit lay in its high mechanical properties and resistance to corrosion and there were some applications where it was used solely on that account.

MR. KROGVIG said the reason he had asked was because in his country there had been proposals for standards for light alloys but that particular alloy had been dropped because it was so difficult to cast and very few people could cast it well enough, though in the light of Mr. Fletcher's remarks, it looked as though they ought to take it up again.

MR. FLETCHER said there should be no misunderstanding—LM10 was the most difficult alloy to cast of the whole series of aluminium alloys and many foundries, including the one with which he was connected in this country, had experienced trouble. However, all the difficulties had now been overcome and it was in steady production. Nowadays, there must now be tens of thousands of castings made every week in LM10 alloy in this country.

MR. MCINTYRE asked whether many pressure-die-castings had been made in that material.

MR. FLETCHER replied that he did not know. His firm did not themselves do any pressure-die-casting but perhaps one of his colleagues would be able to supply an answer.

MR. F. H. SMITH, commenting on the last point, said there was one basic principle which he imagined would prevent the pressure-die-casting of LM10 alloy and that was that the alloy was only used in the heat-treated condition and with normal pressure-die-casting practice it was, of course, impossible to solution-heat-treat the castings. That would appear to be the simple answer rather than shortcomings of casting technique.

MR. FLETCHER added that the significant iron content would practically preclude the alloy being used for pressure-die-casting.

### Vote of Thanks

THE CHAIRMAN (Mr. J. Bell), proposed a vote of thanks to the Author for an interesting Paper, which had raised an exceedingly lively discussion. He said, incidentally, that he himself had been trained and worked in an iron foundry and during the first world war had been in charge of a large non-ferrous foundry, for some two years. Afterwards, he had returned to the ironfoundry side, but he always regretted very much that he had no first-hand experience of light alloy foundrywork.

The vote of thanks was accorded with acclamation and MR. FLETCHER, responding to it, thanked his colleagues on the Technical Committee of the Light Metal Founders' Association who had helped him with some of the applications mentioned in the Paper.

---

### Liquid-cooled Turbine Blades

One of the most important fields of development for the gas turbine lies in the operation at turbine-inlet temperatures much higher than those at present possible. The subject is discussed in a paper on heat-transfer problems of liquid-cooled gas-turbine blades, presented by Dr. H. COHEN and F. J. BAYLEY, to the Institution of Mechanical Engineers. The authors briefly survey the possible methods of cooling gas-turbine rotor blades, and suggest that the most attractive is the thermo-syphon system, in which a quantity of liquid is enclosed within each blade to act as a conveyor of heat to the more easily cooled root. Two experimental investigations of this system are described, the first using a rotating apparatus, and the second a static rig.

---

SINCE OCTOBER 1, the address of Leopold Lazarus, Limited, has been City Wall House, Finsbury Pavement, London, E.C.2, and the telephone number Metropolitan 8831.

## Fuel Efficiency Exhibition

The Fuel Efficiency Exhibition which is being held at the City Hall, Manchester (it opened on Wednesday, October 12, and closes on Saturday, October 22), is organized by Provincial Exhibitions, Limited, under the auspices of the Combustion Engineering Association and the National Industrial Fuel Efficiency Service. The theme of the exhibition, as explained by Sir Miles Thomas in his speech at the official opening, is the elimination of wasteful methods of producing and consuming heat, light and power. Although one speaker stated that to bring this country's fuel consuming plant up-to-date would cost the staggering sum of £500,000,000, the urgency of tackling the problem in these days of fuel shortage is manifest in the statement of another speaker that one inefficient boiler operator can waste the output of one miner. In this connection it may be stated that Mr. Jack Tanner's attendance at the exhibition to present prizes to outstandingly successful candidates in the City and Guilds course for furnace operators was a public service.

The sister theme of the exhibition is perhaps that clean air and fuel-efficiency go hand in hand, and one of the stands of particular interest is that of the Fuel Research Station of the DSIR which demonstrates some of the research being carried out on smoke-eliminator doors for industrial boiler furnaces, atmospheric pollution, "smog"-watcher's equipment, and the purifying of power-station flue gases. The health department of the City of Manchester have some interesting exhibits illustrating the startling changes which have been effected in Manchester's smokeless zone, where the reduction of smoke emission has reduced the airborne deposits from 6,000 to 168 tons per annum.

The exhibition has received widespread support and all available space has been taken by the 94 firms who are exhibiting. While the greater part of the equipment on show is for industrial use, the domestic side has not been neglected. Viewed quite impartially, a visit to the exhibition becomes a "must" for those who have an interest in the field of fuel efficiency.

## POA President's Address

Mr. F. J. White, president of the Purchasing Officers' Association, in his address at the annual conference of the Association, said that with the world's raw materials being used up at an alarming pace, a continuous and concentrated effort on salvage and recovery was vital to the future improvement of living standards. According to the Association's economic survey committee, members were holding stocks covering from three to nine months. The reasons for these comparatively high figures were (1) current marginal shortage of some materials, (2) unreliability of deliveries, (3) uncertain service from the railways.

A sample survey amongst member firms showed that approximately 53 per cent. of the original promises given by suppliers were not kept and 39 per cent. of revised promises also failed. The persistence of the "sellers' market" had had the regrettable result of perpetuating the "price ruling at the date of delivery" clause.

"Conditions of sale" had multiplied in recent years, as each trade association tended to draw up its own lawyer-drafted conditions, framed to protect the seller. Many of the clauses took from the purchasing officer some of the redress which might be his under Common Law. "Conditions" should be drawn up by professional bodies.

## Tata Iron & Steel's Expansion

In his statement accompanying the annual report of the Tata Iron & Steel Company, Limited, for the year ended March 31, Mr. J. R. D. Tata, the chairman, says that the Government of India proposes to erect three steelworks of about 1,000,000 tons each and to operate them under State ownership and management. This, he says, will still leave the country short of its target of 6,000,000 tons of ingot steel by 1961. Instead of building a fourth plant, therefore, the Government has agreed that existing private plants should be allowed to expand further.

As the Tata company's present programme, already under way at Jamshedpur, will bring the company's capacity by 1958 to 1,300,000 tons of ingots, this new expansion involves the creation of an additional 700,000 tons of capacity at an estimated cost of Rs.60 crores.

Mr. Tata says that financing presents a serious problem and it was decided that, in order to maintain financial stability, not more than half the estimated cost should be financed from borrowings. Of the balance, Rs.20 crores is to come from internal resources and Rs.10 crores from the issue of new equity capital.

## IBF in the West Country

During the National Works Visits Day functions of the Institute of British Foundrymen in the Bristol area on October 7, a party of fifteen guests paid a visit to T. H. & J. Daniels, Limited, at Stroud. They were met by Mr. J. L. Daniels, the managing director, at Moor Court Hotel, where they were entertained to luncheon, and spent the afternoon being shown round the works and foundry. Particular interest was taken in the development of the $CO_2$ process (Fig. 1), machine moulding knock-out, and cupola spark arrester.

FIG. 1.—*Visiting IBF members discussing a $CO_2$-Process mould with the Foundry supervisor, Mr. C. Blackburn (right), at T. H. & J. Daniels, Limited.*

## Oil Industry Liaison Talks

Talks which it is hoped will result in closer liaison between the petroleum industry and the companies which supply its equipment, are proposed by the Council of British Manufacturers of Petroleum Equipment. At the Council's annual dinner, Mr. G. V. Sims, managing director of Le Grand, Sutcliff & Gell, Limited, Southall (Middx), and chairman of the Council, said that it was also planned to hold an informal discussion which would enable manufacturers to make sure that the petroleum industry was fully aware of the research and development going on in the research departments of members interested in the various aspects of metallurgy, especially where these had been carried out for industries other than the petroleum industry.

Mr. Sims said that all too many criticisms had been levelled against British manufacturers of failing to follow up their products and find out the needs of their overseas customers on the spot. The Council was doing everything possible to provide information for its members who intended going abroad and to gather information from those who had returned. There were over 400 members of the Council, and most of the £63,000,000 orders for equipment placed in this country by the petroleum industry during the first half of the year had gone to members.

In the second quarter of this year oil companies placed orders worth £30,400,000 for materials and equipment in the UK. This was £2,400,000 less than in the previous quarter. The figures include a large proportion of orders for use overseas.

Major items include specialized drilling and production equipment (£3,200,000), tubulars, pipe fittings, and valves (£4,600,000), drums, drumsheets, and tinplate (£2,600,000), machine and hand tools (£2,300,000), specialized refinery equipment (£1,800,000), and electrical equipment (£1,600,000).

## Ulster Opportunities

Many British manufacturers have reason to look back with satisfaction on decisions they took in the 1930s to launch out into the large trading estates established to help solve the problem of development areas in Great Britain. The modern industrialist seeking a field of expansion could do far worse than look towards Northern Ireland, where there is now opening up an opportunity of a similar kind. According to Lord Chandos, chairman of the British Thomson-Houston Company, Limited, and chairman of the new Northern Ireland Development Council, Ulster has a number of advantages to offer which contrast greatly with the difficulties confronting many British companies in their own territory, one prime consideration being that the Northern Ireland Government is prepared to help by making grants and leasing plants on favourable terms.

Lord Chandos appropriately voiced these views at the laying of the foundation stone of the office block for the new £8,000,000 BTH turbine works at Larne (Co. Antrim). Viscount Brookeborough, Prime Minister of Northern Ireland, who performed the ceremony, described the project as one of the largest single post-war industrial developments in Northern Ireland.

Mr. B. LONGSTAFFE has relinquished his position with Henry Wallwork & Company, Limited, Manchester, to take up an appointment as foundry manager with Sykes & Harrison, Limited, Port Penrhyn foundry, Bangor, North Wales.

## Statistics Course for GEC Workers

In to-day's industrial atmosphere of keen competition, the business executive in all departments is relying increasingly on statistics to give him a ready answer to many problems of production and selling. They are not only of importance to the executive, of course, but there is a tendency for familiarity with them to be confined to the loftier regions in a company's organization. The General Electric Company, however, aims to create a wider understanding of statistical methods within the company and to indicate where they can be used to advantage to improve the productivity of goods by running a course of lectures for employees throughout the organization on the statistical analysis and the presentation of data.

The lectures will be delivered by Miss Joan Keen, head of the statistical service group at the GEC research laboratories, and the course will be in two parts. The first will begin this month and the second about six months later. The first part, dealing with some of the quality control techniques useful in production and inspection, will be given to staff employed on this work and those on research and development. Lectures and practical sessions, supervised by members of the department, will cover the fundamentals of statistical analysis, including the study of distributions, the use and computation of standard deviation, control charts, and sampling inspection schemes.

The second series of lectures and practical work will deal with more advanced topics likely to be useful to development, technical, and research staff. Employees from works and laboratories in the provinces will attend a continuous five-day course, while those in the London area will attend for one day a week during five consecutive weeks.

## *Film Reveiw*

A new film, "Mechanical Handling on Show" sponsored by *Mechanical Handling* and with a commentary by Frank Phillips, the well-known B.B.C. commentator was introduced in London last week. It provides a pictorial record of some of the main exhibits at the Mechanical Handling Exhibition which was last held in 1954. One or more examples of each of the various classes of mechanical-handling equipment are shown and the commentary gives information on the general operational features of the equipment, together with the classes of goods they are designed to handle. Glimpses are given of numerous exhibits in operation, handling various commodities and materials, from fork trucks and conveyors to earth-moving equipment. An overhead-travelling crane with radio control is demonstrated; this being particularly applicable to the handling of dangerous materials, as the operator can work at a distance or even outside the room looking through a glass screen. Shown in operation also is a vibratory conveyor and feeder which it is claimed can handle most types of material, including hot sand. It is mounted on coil springs so that no vibrations are transferred to the floor. Numerous types of fork-lift trucks are demonstrated, among them one primarily designed where heavy loads must be handled in a confined space, and one fitted with a load-clamping device with a Wheelaweigh attachment. This 16-mm., 30-min. colour film is intended also as a "curtain-raiser" for the next Exhibition, to be held at Earls Court, London, May 9 to 19, 1956.

# S.-g. Iron in South Africa

A Paper, " Spheroidal Cast Iron," by J. Creydt, read to the Institute of British Foundrymen, South African branch, deals with the production of s.-g. iron, the furnaces used, analysis and influence, of various elements and their physical properties. The application and future of s.-g. iron in industry is also discussed and the prices compared with iron and steel castings. Commenting on the position peculiar to South Africa, the Author states:—

"It is estimated that all over the world some 3,000 foundries made more or less extensive trials to produce s.-g. iron. I am unable to tell how many foundries in this country tried to produce this metal; as a matter of fact, so far only two foundries have succeeded in taking out a licence. These two are James Barwell in Alberton and the Vanderbijl Engineering Corporation—the licence to Barwells was granted in 1951 and to the Vanderbijl concern in March, 1953. While Barwells are more interested in small items, Vecor prefer the medium and heavy castings. Trials to make s.-g. iron to the cerium process started at Vecor in August, 1949, on a very small scale, but gradually were extended and Vecor switched over to the use of copper/magnesium in 1949. The main object was the production of rolling-mill rolls, as it was obvious, even in those early days, that this would be the most promising application for this metal, especially as the competition for rolls is very keen. In spite of having no competitor in this field in South Africa, Vecor had to compete with the most famous roll foundries in Britain, America, Germany and Belgium. After some unavoidable difficulties in the beginning, Vecor is now in the market with this type of roll. The big consumers recognize that the South African made s.-g. iron roll is superior and cheaper than very good "indefinite-chill" and steel rolls from overseas. Soon after Vecor got the licence from London, the switch from Cu/Mg. to Ni/Mg. was made for the benefit of the quality. Production of s.-g. iron is today 10-15 per cent. of the whole production at Vecor's foundry and is still rising, especially for rolls."

## Typical Castings

The series of pictures shown at this stage during the Paper included a winder for the gold mines made in s.-g. iron. It was an underground four-drum hoist used for shaft sinking purposes, the casting weight being 13 tons. The hoist consisted of four drums or eight halves of 12-ft. dia. and 6 ft. between flanges. Drums, spiders, gears, brake drums, distance pieces were all made from s.-g. iron.

All these castings were annealed to special instructions, to give a maximum of elongation. With a remarkable consistency, the figures obtained were within the following limits. Ultimate tensile: 27 to 29 tons per sq. in., elongation: 20 to 15 per cent. Other typical applications he mentioned were parts for tractors and agricultural machines; parts for automobiles, such as brake drums; tyre moulds; parts for presses (tables, cylinders and rams); dryer drums made in s.-g. Ni-hard, used for producing glue, dried milk, etc.,; glass moulds, plates for electro-magnets, which must be non-magnetic; wearing plates in the iron-ore mines made from s.-g. Ni-hard; and sleeves for piercing presses.

In the last instance, it had been established that up to 32,000 billets have been pierced in comparison to about 6,000 billets pierced with imported and locally-made press pots. An enormous variety of small castings can be made in s.-g. iron where the risk is too high for steel, or the wall thickness is too small, etc. Complicated small castings where the customer previously specified steel were now made in s.-g. iron giving, at a fair price, a casting with physical properties similar to steel.

## Future

The Author concluded with remarks about the outlook for the future of s.-g. iron. After working for over 5½ years with this new metal, he believed that it was going to stay as an important engineering material. It was not a material which could be used or should be used for every application. It would not take away orders from the other foundries, as regards cast iron, steel or malleable iron, but as production in the foundries increased with the population and the standard of living, there was certainly a part of the whole production going to the s.-g. iron manufacturers. The outlook as regards rolls was very good. An American licensee reported that 50 per cent of his turnover in dollars was credited against the production of s.-g. iron rolls. He did not think there would be a fight for orders between the iron and steel foundry industries or the Meehanite producing foundries, but was convinced that everybody would get a share in the market. The production of s.-g. iron would be left to medium and big foundries, which were well equipped and had laboratories and metallurgists to watch properly the production of this sensitive metal. In his opinion it was out of the question for small foundries without specialized metallurgical knowledge and equipment to undertake to produce this type of metal, and he doubted that a licence would be granted to such foundries. As regards costs, he doubted if in the very near future it would be possible to reduce the price by any substantial amount.

The position in South Africa was somewhat depressing. In comparison to prices overseas, steel castings were extremely cheap in South Africa: the same applied to manganese-steel castings. This picture was depressing first of all as the steel foundries suffered under their own low prices and secondly as the iron and s.-g. foundries were involved in the competition against steel castings. Without hesitation, he would say that he was convinced that s.-g. iron was an excellent material for certain purposes, but was also sure that it was not the "cure all" some people thought it would be when they first started to produce.

## Conversion to Oil Burning

Outstanding results have been achieved by Richard Thomas & Baldwins, Limited, and the Steel Company of Wales, Limited, by the conversion of furnaces from coal to oil firing. *Ingot News*, the RTSC Group journal, reports that in the tinplate division 58 mills have been converted to oil, and there have been numerous change-overs on other plant. A scheme has also been completed for the conversion of the Melin-griffith-type tinning machines to oil.

It is stated that marked economies have been achieved, particularly in the case of coal, where a saving of about 1,100 tons weekly has been achieved. Overall fuel costs have been cut by the use of oil, and there is considerably less maintenance work on furnaces, in which relining has been cut to negligible proportions.

A statement issued recently by the Production and Export Promotion Committee of the Industrial Association of Wales and Monmouthshire advises its members to pursue a policy for the adoption of oil in place of coal as the main motive power for industry. The committee says that a feeling of unanimous disquiet has been engendered as to the future of coal by the continuing increase in price and the equally consistent decrease of production. The report of a record deficit in the quarterly returns announced by the National Coal Board a few weeks ago, the statement continues, suggests that in spite of the millions of pounds' expenditure on the mines it is extremely unlikely that the country will ever get the benefit of better and cheaper supplies of coal which should be expected from this huge outlay.

This situation is producing among industrial managements in Wales a conviction that in the struggle to stabilize their production costs the time has come when coal can no longer be regarded as an ally, and that manufacturers must examine with urgency and great care the prospects of alternative forms of power for future use. The committee expresses the intention of initiating a drive which will have as its main theme the advisability of Welsh industries placing themselves in a state of readiness to carry out conversion of their fuelling systems at short notice. This the committee regards as a "safeguarding policy" in which a lead has already been given by the Central Electricity Authority's decision to convert 14 coal-burning power stations to oil.

## RTB Milestone

When the first ton of steel was rolled at the hot-strip mill of the new Ebbw Vale works of Richard Thomas & Baldwins, Limited, 17 years ago, on October 3, 1938, Mr. Jack Beese, as head roller, was there to watch it. This was a memorable event in the history of British steelmaking, for it brought into commission the first continuous wide-strip mill to operate anywhere in the world outside the United States. It was an outstanding date for South Wales also, as it marked the end of Ebbw Vale's seven years of depression.

Three days before the seventeenth anniversary of the opening of the mill, another ceremony was held at the Richard Thomas works to celebrate the passing of one more important milestone in the company's history. This time it was the rolling of the 10,000,000th ton of steel on the mill. Among the spectators was Mr. G. A. Young, assistant managing director of the company and general manager of the Ebbw Vale section.

## Government Policy on Trade Fairs

British participation in overseas trade fairs is being held in a cleft stick of criticism. On one hand British industry and the Government are reproached for failing to instal a display as imposing as that provided by somebody else. On the other manufacturers are complaining that there are too many trade fairs throwing on them an unwarrantable burden in expense and the time of their staff. In the *Board of Trade Journal*, the Government has set out its policy, which starts from the belief that the object of taking part in trade fairs is to sell goods and that selling is the job of individual firms.

The Board of Trade says that the individual firm, therefore, will decide as a matter of commercial judgment whether participation is justified and it would be entirely wrong for a Government department to influence this commercial decision. The board's main task is to collect and make freely available as much information as possible about the character, costs, and standing of all overseas fairs and to provide firms with advice about the problems likely to be encountered and the ways to overcome them.

The Government sees no reason "to oppose the view widely held in British industry that, wherever adequate trade sections are available in a trade fair as well as national pavilions, the interests of firms will best be served by their exhibiting in those trade sections. Not only has the Government no intention of itself organizing a national pavilion in such a fair, but it will offer no support of any kind to any firm which may attempt to organize one."

A proviso has been added, however, that the Government supports firms organizing British pavilions at fairs where this is the only method by which British firms can exhibit at all, and, indeed, it did so at Delhi and Karachi.

## Study of Domestic Heating

Important developments in the pattern of domestic heating can be expected in the next decade. The Clean Air Bill has been launched, there is a substantial programme of new housing to be built, and a deal of slum clearance to be undertaken. The shortage of fuel resources and the horror with which the degree of inefficiency in the use of coal for household purposes is viewed are further combining to underline this aspect of fuel consumption. Indeed, this is to be the subject of a special study to be undertaken by the Institute of Fuel next spring.

An opening conference will be held at Church House, Westminster, on May 1 and 2, and for some time an organizing committee has been laying plans for the study. More than 30 papers have been arranged and the opening conference will extend over five sessions. The first will be devoted to smokeless fuels and their production; heating appliances, including their design and application, will feature in the second. The third and fourth sessions, devoted to architecture and design of dwellings and the organization and administration of a smokeless zone, will be followed by a general discussion.

Some emphasis will be laid on the importance of developing and encouraging the use of freestanding domestic space-heating appliances. Three prizes of 200 guineas each will be offered in a competition in connection with the conference for the best designs of artistic merit and practibility for surrounds and settings into which freestanding heating appliances for any type of selected fuel can be fitted.

# Tackling the Apprentice Problem in the Bristol Area

*By Michael Fallon*

An attempt is being made in Bristol to solve the problem of the practical education of foundry apprentices. At the Bristol College of Technology, where the City and Guilds courses are conducted, a small foundry has been laid down and a thorough scientific and technical background is being given. The College say they want students to realize there is more in foundrywork than just sand ramming. They are trying to make them receptive to all the various scientific advances and new developments now becoming available. The course, which has the full interest, support and co-operation of many local founders, is said to be attracting the better type of student and has been praised by local executives as extremely good for the trade as a whole.

## Foundry Equipment

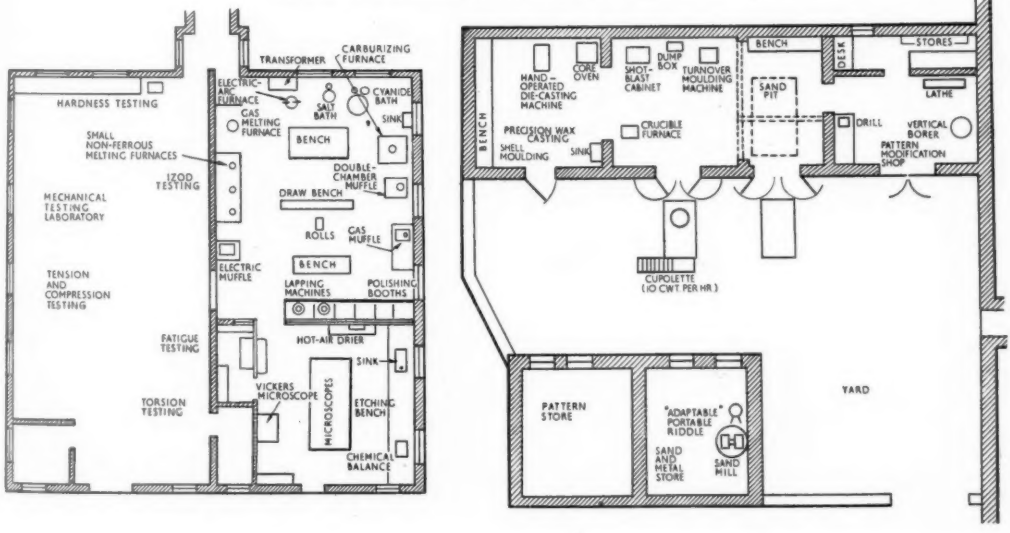
The new foundry building is part of the well-appointed three-storey buildings which are in the process of becoming the College of Technology and were at one time Mullers' Orphanage. The foundry building at the rear of the College is well-lighted, airy and attractive. A quantity of modern machinery is being installed; in the pattern modification shop, which forms one part of the main foundry building, there is a lathe, a grinder, and drilling and boring machines. There will also be benches, vices, and hand tools. In the casting shop (Fig. 1) there is a sand-pit 10 ft. by 6 ft. by 5 ft. for larger castings, and facilities for bench moulding and for gravity- and pressure-die-casting in metal moulds. Shell moulding and wax-pattern moulding will also be carried on. It is also intended to instal a gas-fired melting furnace of the crucible type, a small cupolette, ovens for baking cores and a turnover moulding machine.

With this equipment, the College authorities feel that their apprentices will be able to tackle all new processes that come along. Typical of new ideas studied is the method of binding sand moulds with water-glass and setting them with carbon dioxide, which process is being studied at the College as part of the second-year intermediate course. The method produces an extremely clean mould and the instructors are anticipating very good results with it.

Across the foundry yard from the main building is the sand store and preparation room which will have a mill, a power riddle and bins for special sands. In the same building is the pattern store. At the present time, wooden patterns given by local foundries are being used, and students will be able to make their own metal patterns in the very well-equipped machine shops of the College, where there are lathes, milling machines and a die-sinking machine. A most important additional feature of the school set-up, however, are engineering science and mechanics and metallurgical laboratories, where the scientific background of foundrywork can be imparted in simple, easy-to-understand language.

Everything is aligned to the practical side of foundrywork, but the College will endeavour not to spend too much time on simple mould-making. Students visit the College on one day a week only, making moulds at their foundries on the other four

FIG. 1.—*Plan views of the metallurgical laboratories (left) and foundry premises (right) of the Bristol College of Technology, Engineering Department.*



*Tackling the Apprentice Problem*

days. The College instructors will attempt to give them a greater grasp of what is actually going on when they make their moulds. In the workshops there are testing machines, ranging from a simple hand-operated device to a complicated motorized machine, and the students are taken from simple experiments to find the strains and stresses of metals under load to more complicated problems such as stresses of metals under heat-treatment. From this they are taken to the metallurgical laboratory where they study the crystalline make-up of metals and are shown what happens when strains occur. In this way they are shown just what stresses are induced by cooling, so as to be in a position to deal logically with them.

With modern advances, there is to-day more need than ever for the scientific approach to foundrywork and the courses provided by the Bristol College of Technology will help to induce this approach. Some measure of their success may be judged from the fact that in the first year of the course they attracted 21 patternmaking apprentices and 14 foundry apprentices, and the majority of these passed their end-of-session examination with flying colours. This year, with the new foundry and improved equipment, it is anticipated that more students will be attracted because of the interesting practical work that now becomes possible.

## N. E. Coast Iron Industry

*Present Position and Trends*

Although the Cleveland ironstone beds are to-day largely depleted, and there is some concern over long-term supplies of Durham coking coals, the North East Coast area continues to hold its own as one of Britain's main iron and steel centres. In view of its local ore and coal and ready access to imported ore supplies, it has relied on pig-iron rather than scrap as its main steel-making raw material. As a result, iron-making has always played a correspondingly prominent role in the area's economy. Production of Cleveland ore, however, has continued to decline and, according to the British Iron and Steel Federation, amounted to only 871,000 tons in 1954, as against 2,040,000 tons in 1937, and 6,000,000 tons in 1913. Consequently, almost all the post-war increase in pig-iron production has been based on imported ore, and improved ore-handling schemes have been given an important place in post-war development plans.

### Pig-iron Production

Pig-iron is produced in ten works, but three of these—Consett and Dorman Long's Cleveland and Redcar works—account for about half of the total normal capacity of 78,000 tons a week. In all, there are 34 blast furnaces in the district, of which 29 can operate at any one time. The size of furnaces has increased since the war, and a further improvement will follow when five new large furnaces are blown in during 1955-57. The growth in the size of furnace, together with the increases in ore preparation and sintering, and greater use of rich foreign ores, has led to an improvement in blast furnace productivity. (At Consett, a further increase is expected as a result of equipping one of the blast furnaces with high-top-pressure gear.) The annual output per furnace increased by 60 per cent., from 74,100 tons to 118,600 tons, between 1946 and 1954, and the coke consumption per ton of iron produced fell by 11 per cent., from 21.6 cwt. to 19.2 cwt., in in the same period. Basic iron is now the main product and accounts for over seven-eighths of total iron production.

Regarding steel production, at present the N.E. Coast accounts for one-fifth of Britain's total steel output. Virtually all the steel produced is of non-alloy qualities. At the end of 1954, there were 96 steel furnaces on the N.E. Coast, of which 28 were associated with the steel foundries. The constructional engineering industry is the main buyer of N.E. Coast steel, taking nearly one-fifth of all the district's finished steel output last year, including some three-eighths of its heavy sections and just over one-fifth of its plates. Of the other principal consumers of N.E. Coast steel, the shipbuilding and ship repairing industry is the most important. The N.E. Coast is a heavy exporter overseas; in 1954, nearly one-eighth of its total output of finished steel was sold abroad.

Development on the N.E. Coast in the next four years will continue on much the same lines as since the war. Between 1954 and 1958, pig-iron production should increase by nearly a third, and steel production by more than a quarter: the district will then have almost doubled its pig-iron and steel production since the war. Most of the increase in steel production will be based on a heavier use of pig-iron. In part, these extra supplies of pig-iron will be forthcoming without further investment, since higher rates of production can be expected from the capacity installed in recent years; but, in addition, five new blast furnaces are under construction. Two new 27-ft. 6-in. hearth furnaces at Cleveland and one 22-ft. 6-in. furnace at West Hartlepool will come into operation later this year, a 22-ft. 6-in. furnace at Cargo Fleet will be completed in 1956, and another of the same size at West Hartlepool will be completed in 1957-58.

## Board Changes

NATIONAL STEEL FOUNDRY (1914), LIMITED—Mr. E. L. Elliot and Mr. P. B. Lake have been appointed directors.

PRESSED STEEL COMPANY, LIMITED—Mr. Alex Abel Smith has been elected chairman in place of the late Major Albert Pam.

G. D. PETERS & COMPANY, LIMITED—Mr. Alexander Dowie, a director, has been elected chairman in succession to the late Lord Inverforth.

SIMPLEX ELECTRIC COMPANY, LIMITED—Mr. S. Farrer has been appointed sole managing director of the company, which is a subsidiary of Tube Investments, Limited, in succession to Sir George Briggs.

# New Equipment

## Reinforced Plastics Fire Hose

Production of "Plastidry" fire hose is being commenced by the British Tyre & Rubber Company, Limited. This is a new concept in fire-fighting hose. "Plastidry" hose consists of tough plastics inner tube and outer cover enclosing and protecting a strong synthetic fabric reinforcement. The inner tube and outer cover form a homogeneous plastic mass in which the reinforcement is completely embedded. Thus, the fabric is never wetted and "Plastidry" therefore never needs drying. The hose can be used, immediately rolled wet, stored and used again without any drying process. It can also be stored indefinitely without deterioration, and it is immune to oils, acids, and alkalies.

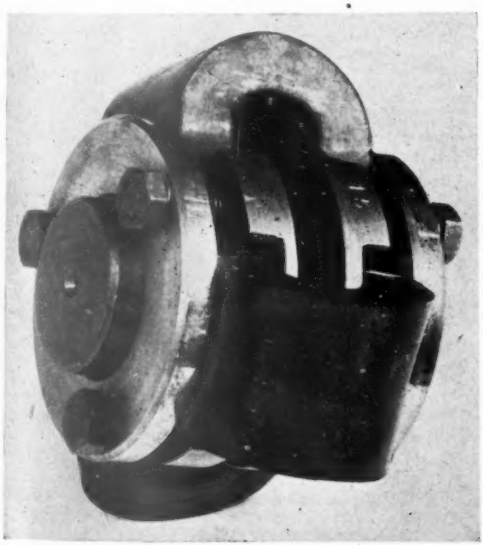
The bore is very smooth, and it is claimed that the hose delivers 60 per cent. more water than canvas hose and 10 per cent. more than rubber-lined hose. The plastics cover, tough in itself, is further protected by an abrasion-resistant outer surface, which prevents damage when the hose is dragged over rough ground; this outer surface also makes for comfortable and easy handling. Notwithstanding its strength and toughness, the hose is extremely light and flexible.

## New Design of Flexible Coupling

A coupling design giving an exceptional degree of flexibility and allowing for considerable radial, angular, and axial misalignment of the shafts is shown in Fig. 1. Known as the "Multicross" type and designed and manufactured by Owl Engineering Supplies, Limited, Doncaster, it is suited to a wide variety of industrial drives.

Construction is both simple and ingenious, transmission of torque being effected by means of special, U-shaped nylon-reinforced rubber cushions which are fitted between the hub flanges and end retaining-plates. The metal-and-rubber-pad construction provides ample protection to both driving and driven machinery because of the adequate damping effect on vibration and the absorption of shocks. Very rapid replacement of the rubber cushions can be made when necessary by slackening the retaining screws, thus allowing the rubbers to be removed and replaced without having to dismantle the shafts or equipment in any way. Three sizes of rubber cushion cover the whole range of couplings available from fractional up to 70 h.p.

FIG. 1.—*"Multicross" three-cushion type flexible coupling.*



## Shell Cores

A new shell-coremaking machine, made by the Shallway Corporation, 1000 South Fourth Street, Connellsville, Pa., USA, model MCM-6, stands 7 ft. high and rests on a 3 by 8½ ft. base. It is designed for corebox es up to 18 by 30 by 12 in. across the parting line and can be altered to accommodate coreboxes up to 36-in. long. The corebox halves are mounted on electrically heated cast-iron plates which are opened and closed by means of geared electric motors. The sand is blown into the box under pressure from an accumulator tank and the unit is then inverted to return the excess sand to the blowhead. After a short period, the corebox opens and the finished core is removed. The machine will produce cores from one corebox each minute. Since the core is cured in the heated corebox, there are no subsequent handling operations. The first unit of the new series was supplied to Stanley G. Flagg and Company, Inc., of Stower, Pennsylvania. The latter company plans to use it initially for the production of iron and malleable pipe-fitting cores.

CHARLES S. MADAN & COMPANY, LIMITED, of Altrincham, announce a junior model of Airhydropump, to fill a gap between standard types and hand pumps. The model is 12-in. long by 3¼-in. dia., weighs 16¼ lb. and gives pressures up to 10,000 lb. per sq. in. from the works air-line. It is claimed to be very suitable for pressure testing of valves and small fittings and, as a source of hydraulic power, for operating small presses, jacks, rams and many other hydraulic mechanisms.

RAPID MAGNETIC MACHINES, LIMITED, Lombard Street, Birmingham 12, announce their latest device, called the "Reguload." It gives the operator a precise and positive control of the amount he desires to handle, and is based on the instrumentation of a diversified electric supply. The new technique can be applied to existing installations.

LONGBOTTOM & COMPANY (KEIGHLEY), LIMITED, announce the introduction of tinned-steel bridge chaplets. They are made in a range from ¼ to 1½ in. deep, varying in width according to size, and raising by $\frac{1}{16}$ in. up to 1 in. size and thereafter by ¼ in. The design is such that they can be pinned on to any part of the mould.

---

## New Open Fire by Radiation

A new design of domestic open fire—the Parkray 3—has been introduced by Radiation, Limited. Particular advantages claimed for it are a low fuel consumption and almost smokeless burning even when using poor-quality bituminous fuels. It is believed to be the only fire of its type which burns its fuel by the down-draught method. In this way a large proportion of the volatiles normally lost up the flue in smoke, are drawn down through the hot fuel-bed and burnt. Thus the smoke given off is only about one-fifth that produced by an ordinary open fire and at the same time fuel is used more efficiently. There is a small flue opening and adjustable throat restrictor. The fire will burn overnight and can be fitted with gas ignition.

# Imports and Exports of Iron and Steel in August

The following tables, based on Board of Trade returns, gives figures of imports and exports of iron and steel in August. Totals for the first eight months of this year and last are also included.

## *Exports of Iron and Steel*

| Destination. | Month ended August 31. | Eight months ended August 31. | |
|---|---|---|---|
| | 1955. | 1954. | 1955. |
| | Tons. | Tons. | Tons. |
| Channel Islands | 615 | 3,094 | 4,169 |
| Cyprus | 415 | 4,290 | 3,208 |
| Sierra Leone | 507 | 7,555 | 5,624 |
| Gold Coast | 2,269 | 23,475 | 16,024 |
| Nigeria | 4,482 | 39,922 | 32,474 |
| Union of South Africa | 3,812 | 29,689 | 44,491 |
| Rhodesia and Nyasaland | 6,873 | 38,670 | 45,460 |
| Tanganyika | 2,461 | 13,744 | 11,185 |
| Kenya | 3,705 | 45,080 | 32,278 |
| Uganda | 404 | 3,761 | 2,858 |
| Mauritius | 235 | 4,192 | 1,599 |
| Bahrain, Qatar, and Trucial Oman | 701 | 15,379 | 7,760 |
| Kuwait | 141 | 4,355 | 1,949 |
| India | 15,184 | 63,423 | 80,636 |
| Pakistan | 3,338 | 37,029 | 27,864 |
| Singapore | 3,776 | 17,775 | 24,258 |
| Malaya | 3,837 | 15,676 | 15,156 |
| Ceylon | 1,187 | 12,847 | 10,763 |
| British North Borneo | 296 | 2,324 | 2,946 |
| Hongkong | 4,136 | 17,306 | 30,808 |
| Australia | 36,167 | 182,482 | 263,785 |
| New Zealand | 17,766 | 134,951 | 169,760 |
| Canada | 8,413 | 119,245 | 71,127 |
| Jamaica | 3,308 | 10,096 | 10,311 |
| Trinidad | 3,689 | 27,067 | 31,225 |
| British Guiana | 621 | 3,729 | 4,425 |
| Anglo-Egyptian Sudan | 1,793 | 22,560 | 11,148 |
| Other Commonwealth countries | 1,856 | 15,305 | 19,744 |
| Eire | 6,309 | 32,980 | 40,033 |
| Finland | 7,476 | 42,701 | 49,673 |
| Sweden | 9,998 | 48,161 | 89,066 |
| Norway | 4,494 | 50,224 | 76,723 |
| Denmark | 5,439 | 57,734 | 53,668 |
| Western Germany | 1,357 | 4,707 | 6,151 |
| Netherlands | 9,204 | 65,466 | 65,400 |
| Belgium | 1,455 | 7,039 | 14,141 |
| France | 640 | 3,347 | 4,038 |
| Switzerland | 769 | 6,930 | 9,736 |
| Portugal | 1,479 | 8,175 | 9,371 |
| Spain | 6,236 | 5,808 | 52,339 |
| Italy | 1,245 | 27,826 | 18,065 |
| Austria | 118 | 954 | 1,831 |
| Yugoslavia | 650 | 10,324 | 10,638 |
| Turkey | 25 | 7,515 | 6,404 |
| Netherlands Antilles | 1,815 | 2,306 | 8,437 |
| Portuguese E. Africa | 286 | 1,727 | 1,383 |
| Lebanon | 2,895 | 1,231 | 12,035 |
| Israel | 586 | 5,693 | 6,431 |
| Egypt | 954 | 18,677 | 15,755 |
| Saudi Arabia | 533 | 2,968 | 4,988 |
| Iraq | 6,760 | 20,128 | 31,914 |
| Iran | 15,924 | 4,269 | 44,360 |
| Burma | 388 | 7,424 | 8,058 |
| Thailand | 322 | 4,755 | 3,313 |
| Indonesia | 117 | 3,769 | 2,454 |
| Philippine Republic | 1,274 | 2,279 | 4,330 |
| USA | 2,028 | 22,757 | 28,708 |
| Colombia | 300 | 6,006 | 3,973 |
| Venezuela | 8,076 | 24,503 | 40,052 |
| Ecuador | 748 | 1,930 | 2,129 |
| Peru | 2,108 | 3,528 | 7,033 |
| Chile | 97 | 822 | 696 |
| Uruguay | 355 | 9,776 | 5,158 |
| Argentina | 2,088 | 43,768 | 38,874 |
| Other foreign countries | 3,884 | 48,428 | 33,582 |
| TOTAL | 240,419 | 1,531,656 | 1,793,975 |

## *Total Imports of Iron and Steel*

| From | Month ended August 31. | Eight months ended August 31. | |
|---|---|---|---|
| | 1955. | 1954. | 1955. |
| | Tons. | Tons. | Tons. |
| Australia | — | 20,103 | 59 |
| Canada | 16,460 | 7,019 | 82,351 |
| Other Commonwealth countries and Eire | 5,411 | 4,468 | 22,957 |
| Soviet Union | 10,549 | 97,532 | 120,867 |
| Sweden | 3,767 | 28,081 | 21,193 |
| Norway | 7,660 | 20,651 | 50,188 |
| Western Germany | 11,608 | 40,654 | 31,479 |
| Netherlands | 18,883 | 64,729 | 107,916 |
| Belgium | 27,592 | 29,886 | 97,426 |
| Luxembourg | 4,571 | 12,369 | 23,496 |
| France | 27,005 | 47,210 | 134,184 |
| Italy | 383 | 7,473 | 1,152 |
| Austria | 11,495 | 129,875 | 81,509 |
| Japan | 1,507 | 55 | 18,783 |
| USA | 73,207 | 50,070 | 511,049 |
| Other foreign countries | 186 | 3,036 | 7,037 |
| TOTAL | 220,284 | 563,211 | 1,311,646 |
| Iron and steel scrap and waste, fit only for the recovery of metal | 101,371 | 548,179 | 833,368 |

## *Exports of Iron and Steel by Products*

| Product. | Month ended August 31. | Eight months ended August 31. | |
|---|---|---|---|
| | 1955.* | 1954. | 1955. |
| | Tons. | Tons. | Tons. |
| Pig-iron | 2,745 | 15,328 | 35,799 |
| Ferro-columbium (niobium)* | 1 | — | 45 |
| Ferro-tungsten | 44 | 350 | 326 |
| Other ferro-alloys† | 245 | 5,291 | 1,919 |
| Ingots, blooms, billets, slabs, sheet, and tinplate bars | 456 | 1,374 | 3,757 |
| Iron bars, rods, angles, shapes, and sections | 216 | 1,815 | 2,334 |
| Steel bars, rods, angles, sections, and shapes | 38,013 | 225,203 | 281,466 |
| Iron plates and sheets | 9 | 264 | 108 |
| Universal plates | 72 | 3,136 | 6,175 |
| Steel plates, ⅛ in. and under ¼ in. | 892 | 8,851 | 13,652 |
| Do., ¼ in. and over | 17,152 | 97,231 | 177,517 |
| Black sheets and black plate | 20,142 | 133,640 | 147,893 |
| Hoop and strip | 7,986 | 67,048 | 70,773 |
| Tinplate | 33,930 | 205,275 | 214,416 |
| Tinned sheets, terneplate, and ternesheets | 194 | 1,520 | 1,901 |
| Decorated tinplate | 337 | 1,853 | 2,797 |
| Galvanized sheets | 14,658 | 112,299 | 110,201 |
| Other coated plates and sheets | 880 | 5,782 | 7,985 |
| Railway and tramway construction material | 31,901 | 151,394 | 177,701 |
| Wire rods | 2,080 | 19,966 | 19,171 |
| Wire | 7,262 | 58,161 | 63,953 |
| Tubes, pipes, and fittings | 60,002 | 401,978 | 444,878 |
| Iron castings | 887 | 8,801 | 5,776 |
| Steel castings | 86 | 2,019 | 1,259 |
| Forgings | 229 | 3,077 | 2,173 |
| TOTAL | 240,419 | 1,531,656 | 1,793,975 |

* Not separately distinguished before 1955.
† The figures for 1955 are not completely comparable with those for previous years.

REFRACTORY MOULDINGS & CASTINGS, LIMITED, have removed from 10, Market Place, Kegworth, Nr. Derby, to Pleasant Place, Kegworth, Leics.

STANTON IRONWORKS COMPANY, LIMITED, announce that the address of their representative in north eastern England, Mr. Tom Murphy, is 22, Queensway, Brunton Park, Gosforth, Newcastle-on-Tyne. (Telephone: Wideopen 511.)

A NEW British Standard specification No. B758:1955, has just been issued covering small domestic hot-water supply boilers using solid fuel. It costs 5s. and is obtainable from the British Standards Institution, 2, Park Street, London, W.1.

# Chemical Research

*Work in Progress at Teddington*

Work now being carried out at the Chemical Research Laboratory, Teddington, Middlesex, is divided into six main groups—corrosion of metals, the inorganic and organic sections, microbiology, high polymers and radiochemistry. These are supported by a general services department, *i.e.* engineering workshops, a glassworking section, library and stores. The laboratory is one of the stations of the Department of Scientific and Industrial Research and was founded in 1925. The present main building was completed in 1933. To this was added the Hales Building in 1947, and the radiochemistry and microbiology buildings in 1952. A total staff of approximately 200 includes 45 scientific officers, 75 experimental officers and 30 scientific assistants. The director of the laboratory is Dr. D. D. Pratt.

Descriptions of work in progress have appeared from time to time in these columns, while an annual report is also published. Naturally, not all of the work is of direct application to the metallurgical and foundry industries, but one or two examples of newer projects are given below.

### Corrosion Studies

*Radioactive Tracer Studies of Corrosion Inhibitors.*—The mode of action of chromates in inhibiting corrosion of steel in aqueous solution is being investigated by many workers. Research at Teddington has been based on the use of potassium chromate containing a proportion of radioactive chromium atoms. The amount of chromium found on a steel surface after immersion in such a radioactive solution is estimated from the amount of radiation emitted from the surface. Using this technique, it has been shown that during immersion in chromate a protective film containing chromic oxide grows on the surface of the metal, in the same way as a surface film of ferric oxide grows during exposure of the steel to air.

*Immersed Corrosion at Elevated Temperatures.*—The influence of temperature on the corrosion rate of metals in contact with aqueous solutions has received only slight attention in fundamental corrosion studies. The need for more detailed information has been emphasized by the increasing number of enquiries received by the corrosion of metals group on metallic corrosion in such equipment as hot-water storage tanks, churn-washing machines, domestic hot-water systems, cooling systems, and boilers. Work has been started by investigating the corrosion of mild steel in boiling solutions containing various types of salts, normally present in natural waters, at different concentrations. The object of this work is to assess the relative corrosivity of these salts and thus to furnish information of value in assessing the corrosivity of natural waters. The inhibition of microbiological corrosion in underground situations has also been a long-term project. Testing of steels in flue-gas atmospheres is another investigation which should eventually benefit the iron and steel industry.

### Zone Melting of Metals

The purification of certain metals by zone melting is a comparatively recent development. The process is, in effect, a continuous fractional crystallization and consists in moving a narrow molten zone along a metal bar at a slow and constant rate. Any impurity in the metal will distribute itself between the solid and liquid phases and, usually, the concentration of the impurity in the two phases will be different. If the concentration in the liquid phase is appreciably greater than that in the solid, the impurity will tend to accumulate in the liquid zone and to be moved along with the zone. The metal freezing out from the molten zone will be purer than it originally was. Repetition of the process will concentrate the impurity in a relatively small section at the end of the bar while the remainder will be of high purity.

The removal of traces of arsenic and other impurities from germanium has been made possible by this technique and has greatly simplified the production of the pure element for rectifiers and transistors. The laboratory is studying the purification by this method of elements such as bismuth, tellurium and gallium which are needed for research into inter-metallic semi-conductors.

## Clean-air Bill Criticized

At the annual general meeting of the National Smoke Abatement Society last month, a resolution was passed without discussion welcoming the Government's Clean Air Bill as embodying in the broad scope of its proposals the principles for which the society has always striven. The Minister of Housing and Local Government was congratulated upon his speed in putting into effect the proposals of the Beaver Committee on air pollution and the society's three-day conference at Bournemouth appeared to be nicely rounded off.

There had been much discussion during the three days, however, which suggested that not all the delegates were happy about the Bill. Mr. Gerald Nabarro, who inspired the whole thing with his Private Members' Bill last year, said he was not very satisfied with the Government Bill which replaced it. It was much too leisurely and allowed too many escape routes for the recalcitrant industrial chimney owner, who would be allowed by the Bill, as it stood, to get away with producing dark and black smoke for seven years. Alderman C. H. Smith, of Wembley, felt that when the Bill went through it should give some yardstick with which local inspectors could measure the degree of nuisance. West Hartlepool's chief sanitary inspector, Mr. A. H. Basford, contended that a considerable proportion of the country's smoke emission was due to the activities of the railways and he would like to see a clause inserted in the Bill which would give the Minister of Transport the same type of responsibility for this undertaking as already obtained for Crown property in Clause 17.

---

HALE AND HALE (TIPTON), LIMITED, had their works outing to Blackpool on October 8, when over 800 people participated.

NO FEWER than 77 students have enrolled for the course on Foundry Science for technical sales representatives currently being held at the Borough Polytechnic, London, S.E.1.

# Company News

HEAD, WRIGHTSON & COMPANY, LIMITED—The Head Wrightson Export Company, Limited, has been formed to extend the company's interests in markets overseas. Mr. Vaughan Pendred has been appointed managing director, with London headquarters at 20, Buckingham Gate, S.W.1.

ASTON CONSTRUCTION COMPANY, LIMITED, structural engineers, of London, N.1—The board announces that the dividend on the 7 per cent. preference shares for the year to September 30, 1955, will not be paid. An ordinary dividend of 7½ per cent. was paid for the year to September 30, 1954.

PARSONS MARINE TURBINE COMPANY, LIMITED—For the year ended June 30 a final dividend of 17 per cent. is recommended to maintain the 20 per cent. total, but this year's payment is being made on capital increased by a one-for-eight free issue. The directors now propose to make a one-for-nine scrip issue.

THOS. W. WARD, LIMITED—An effective rise of 2½ per cent. in the dividend for the year to June 30 is shown in the preliminary statement. The final dividend is raised from 10 per cent. to 11¼ per cent., making 15 per cent. For the previous year a total of 15 per cent. included a 5 per cent. interim which was paid on £1,100,000 before a 100 per cent. scrip issue.

F. W. BERK & COMPANY, LIMITED, chemical manufacturers, of London, W.C.1—Underwriting is now in progress for the issue of 1,920,000 ordinary shares of 5s. each to be offered by way of rights to existing ordinary shareholders in the proportion of three new ordinary shares for every five shares held. The price of the issue is expected to be 6s. 3d. per share.

ASQUITH MACHINE TOOL CORPORATION, LIMITED—The company's offer to purchase the whole of the issued share capital of George Swift & Sons (Holdings), Limited, the Halifax machine-tool making group, in exchange for ordinary shares in the corporation has been accepted by a substantial percentage of both the preference and ordinary shareholders. The period for acceptance has been extended to October 24.

WILLIAM SUGG & COMPANY, LIMITED, gas engineers and aluminium and non-ferrous founders, of London, S.W.1—Shareholders are to receive a final dividend of 15 per cent., to make 20 per cent. for the year to June 30, 1955, on the doubled capital of £229,264. For 1953-54, on £114,632, the 25 per cent. final made a total of 35 per cent., equivalent to 17½ per cent. on the present capital. Group net profit is £64,989, against £57,913.

RICHARDSONS WESTGARTH & COMPANY, LIMITED—An interim dividend of 6¾ per cent., on £1,769,360 ordinary capital—the first since the 4 per cent. on £1,061,616 in 1943-44—is declared. For the year to March 31, 1955, the dividend was 16¾ per cent. Last month 1,415,488 shares of 5s. at 12s. 6d. were offered to ordinary holders in the ratio of one for five and 250,000 shares were offered to employees. It is reported that the offer has been oversubscribed.

MIDLAND ELECTRICAL MANUFACTURING COMPANY, LIMITED—The company has purchased the whole of the share capital of J. H. Tucker & Company, Limited, electrical accessory manufacturers, of Tyseley, Birmingham. Mr. J. B. Tucker, chairman and managing director, has agreed to remain on the board of that company until the end of this year to assist in the transition, and Mr. J. C. H. Tucker has been appointed general manager with a seat on the board.

# Contracts Open

*The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.*

FORMOSA, October 28—Iron and steel pipes and fittings, steel plate, and welding electrodes, for the Central Trust of China, US Aid Division. (ESB/21176/55.)

FORMOSA, November 5—Brass bar, bronze bar, copper sheet, and brass sheet, for the Central Trust of China, US Aid Division, Taiwan. (ESB/21326/55.)

THAILAND, November 30—Rail fastenings and bearing plates, for the State Railways of Thailand, Bankok. (ESB/21704/55.)

TURKEY—Miscellaneous equipment and materials, including reinforcing and cable steel, steel shell, tools, and machinery, for the Raymond Concrete Pile Company of Delaware, New York, USA. (ESB/21113/55.)

FORMOSA, October 28—Cooling tower, valves, regulators, and pressure gauges, for the Central Trust of China, US Aid Division, Taiwan. (ESB/21173/55.)

INDIA, October 31—Construction, mining, and conveying equipment, for the India Supply Mission, Washington, DC, USA. (ESB/21560/55.)

INDIA, closing dates vary for individual items, earliest December 1—Steam locomotives with bogie tenders, Diesel shunting locomotives, locomotive boilers, fireboxes, wagons, underframes, wheel sets, air-conditioning units, bogie coaches, etc., for the Railway Board, Government of India. (ESB/21163/55.)

SOUTH AFRICA, October 21—Cable terminal assemblies, for the Corporation of the City of Durban, Telephone Department. (ESB/21304/55.)

SOUTH AFRICA, November 2—Electric furnace, for the Stores Department of the South African Railways. (ESB/21348/55.)

# Changes of Name

Among companies which have recently changed their names are those listed below. The new titles are given in parentheses.

LANGSTONE ENGINEERS, LIMITED, Langstone, Mon (C. W. Morgan, Limited).

BUILT METALS, LIMITED, 109, Cornwallis Road, London, N.19 (Built Metals Lubricants, Limited).

CHARLES JONES (ENGINEERS), LIMITED, 242-252, London Road, Staines, Middx (Ironcrete, Limited).

YONEX SMALL TOOLS LIMITED, Tyndale House, Tyndale Lane, London, N.1 (Sydney C. Gough, Limited).

ROYFORD ENGINEERING, LIMITED, 75, London Road, Southborough, Kent (Kessex Tractors, Limited).

SERVICE (ENGINEERS), LIMITED, Leek New Road, Burslem, Stoke-on-Trent (Progress Engineers, Limited).

JOSEPH HEALEY (ENGINEERS), LIMITED, Pleasant Hill Street, Liverpool, 8 (James Troop & Company (Garston), Limited).

RIGHT ENGINEERING COMPANY (BROCKLEY), LIMITED, 276, Brockley Road, Brockley, London, S.E.12 (Malcon, Limited).

PRESSURECAST PATTERN PLATE COMPANY, LIMITED, Lime Bank Street, Manchester, 12 (J. J. Harvey & Pressurecast, Limited).

# Recent Wills

JENKINS, ALLAN, retired mining engineer, of Dublin, and formerly of Belfast ... ... ... ... ... £53,230

RUTTER, J. F., of Rutter Bros., brass and iron founders, of Brierley Hill (Staffs) ... ... ... £16,551

HAMPTON, J. S., a director and general manager of Davy & United Roll Foundry, Limited, Middlesbrough ... ... ... ... ... ... ... ... £23,929

HARDY, PHILIP, former partner in George Humphreys & Company, consulting engineers, of Newcastle-upon-Tyne ... ... ... ... ... ... ... £9,277

BROWN, W. H., proprietor of A. R. Parsons & Company, Limited, scientific instrument and press tool makers, of London Colney (Herts) ... ... £86,836

GRANT, SIR ALLAN JOHN, late managing director of Thos. Firth & John Brown, Limited, chairman of Firth Vickers Stainless Steel, Limited, and managing director of John Brown & Company, Limited, Clydebank, a former Master Cutler, and president of the British Iron and Steel Federation ... ... ... ... ... ... ... ... £55,682

## New Catalogues

**Foundry Sand-testing Equipment.** It is significant of modern development that it requires a 36-page catalogue to cover this subject, for but a few years ago the squeezing of a handful of sand sufficed. Even to-day it is correctly asserted that all these modern tests will not state whether a sand will or will not scab. They will—and this is of supreme importance—enable a foundry to set a standard and maintain it. A very fine and comprehensive range of sand-testing apparatus is well described and excellently illustrated in catalogue No. 384, just issued by Ridsdale & Company, Limited, Newham Hall, Middlesbrough. The equipment covered is of both American (Dietert) and British design. This combination may be responsible for the use of both Centigrade and Fahrenheit scale, and it is here germane to state that the Foundry Trades Equipment and Supplies Association by resolution have shown preference for the former. Perhaps the most interesting section of this catalogue is that dealing with various accessories now available for extending the use of sand-strength machines. This useful catalogue is one which should be filed for reference. It is available to readers on writing to Newham Hall.

**Hand and Face Dryer.** Crypto Limited, North Circular Road, London, N.10, have used a six-page folder to illustrate and describe a new machine for use in works lavatories and the like, for replacing towels. It is pedal operated, and finished in vitreous enamel.

## House Organs

**Aluminium Courier, No. 31.** Published by the Aluminium Development Association, 31, Grosvenor Street, London, W.1.

This is a special issue devoted to the Aluminium Centenary Exhibition and is of outstanding interest. For instance, an eighty-year-old aluminium bracelet is described and illustrated. The main body of this magazine is, however, devoted to describing the exhibits and the interest taken in the show by H.R.H. the Duke of Edinburgh is stressed. Together with the official guide, it forms an excellent survey of an exhibition of outstanding importance.

**Waterways, Vol. 1, No. 1.** Staff magazine of British Waterways, published from 222, Marylebone Road, London, N.W.1.

This magazine, which is to appear bi-monthly, replaces the now defunct "Lock and Quay." As the canals are widely separated, the object of the new publication is to serve as a link. This is really quite a difficult job because the marriage of a typist in Gloucester does not interest readers working the Leeds and Liverpool canal. The illustrations which have been used are excellent.

**Wiggin Nickel Alloys, No. 34.** Issued by Henry Wiggin & Company, Limited, Thames House, Millbank, London, S.W.1.

This issue describes, in its first article, the uses to which Nimonic alloys are put by the Incandescent Heat Company Limited, in their range of furnace applications.

---

DOWDING & MILLS, LIMITED, announce that their London telephone number has now been changed to: Amherst 8351 (5 lines).

## New Patents

*(Copies of complete specifications are obtainable from the Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3/8.)*

**738,045.** Wargöns Aktiebolag, Vargon, Sweden.

A method of treating a metal melt. A supply body consisting of a sintered metal powder in the form of a solid coherent and porous skeleton. The pores of this skeleton are partially filled with a treating agent having a lower melting point than the skeleton. This process is suitable for nodular cast iron.

**738,094.** Regie Nationale des Usines Renault, 8-10, Avenue Emile Zola, Billancourt (Seine), France.

A method of heat-treating cast iron. White iron is cast, the cast iron containing copper between 0.7 and 3 per cent. Preliminary quenching is done at a temperature just above the temperature at the end of the eutectoid reaction. The white iron is then heated to a temperature between 400 and 500 deg. C. for long enough to cause formation of graphite nuclei and also is heated to a temperature above that of eutectoid reaction for long enough to cause complete graphitization of the primary cementite.

**738,381.** Société Anonyme John Cockerill, Seraing, Belgium.

A metallurgical furnace used for melting, refining, or as a reverberatory-type of Siemens-Martin furnace. It has a horizontal longitudinal axis and an independently curved roof arch surmounting the side walls. The internal surfaces of these side walls are inclined towards the centre of the furnace so as to reduce the span of the independent arch.

**738,355.** George Fischer, Aktiengesellschaft, Schauffhausen, Switzerland.

A cupola furnace, having a blast-heater heated by furnace gas. An expansion chamber is situated above the inclined upwardly-extending off-takes for furnace gas withdrawal. The chamber is of such a size as to reduce gas velocity in order that the dust particles in the gas flow settle and fall back into the furnace.

**738,399.** Ernst Adalbert Pokorny, 115, Cholmley Gardens, Fortune Green Road, London, N.W.6.

A process for the recovery of vanadium and for the removal of phosphorus, silicon and vanadium from cast iron and steel. These elements are oxidized by adding sulphate and/or alkali-metal sulphate and/or calcium sulphate in admixture with an alkali-metal carbonate and/or alkali-metal oxide and/or alkali-metal silicate, the proportion of sulphate to the alkali-metal carbonate/oxide/ silicate being between 10 to 1 and 1 to 1, preferably 3 to 1.

*Patent Office Library Centenary*

At an exhibition held last week, the Patent Office Library celebrated its centenary with displays of historical documents, books, publications, and models. THE FOUNDRY TRADE JOURNAL was there, representing one of the journals which was started in the 1900's. On view also were several interesting patents, for example, one taken out in 1856 for the Bessemer process for iron and steel production, and that of 1867 taken out for the Siemen's process of casting steel. Also displayed was the Mond Nickel patent for nodular cast iron, first published in 1940.

# News in Brief

AN ORDER for the production of high-purity hydrogen from propane, using the Hercules re-forming process, has been obtained by the Power-Gas Corporation, Stockton-on-Tees, from Unilever, Limited.

SINCE its origin 89 years ago the Caledon Shipbuilding & Engineering Company, Limited, Dundee, has launched 500 vessels—a milestone achieved when the Ellerman liner City of Winnipeg went into the water.

A KITCHEN to cater for the requirements of home and overseas visitors to the works of F. Perkins, Limited, diesel-engine manufacturers, has been opened by the company at Peterscourt, Peterborough, the headquarters of the marketing division.

ALLEN WEST & COMPANY, LIMITED, of Brighton, have used a novel cardboard cut-out model of a direct switching starter as a folder addressed to maintenance engineers. The letterpress, carried on the reverse, directs attention to salient features of the design and offers full technical details on application being made to the firm.

AT THE Building Exhibition to be held at Olympia, November 16 to 30, Radiation Group Sales, Limited (solid-fuel division), on stand M.261, National Hall, will include demonstrations of their Heatmaster model, and a new fire (the Parkray). Among space and water heaters are to be the Nautilus 55 automatic boiler and the Chevin Mk. II boiler flue set.

THE SEPTEMBER CATALOGUE of publications issued by the British Productivity Council from 21, Tothill Street, London, S.W.1, reveals that a "Productivity Review" on pressure-die-casting is to appear this month (price 2s. 6d.). Other publications in preparation include a Review on freight handling and "Action Pamphlets" on quality control and plant maintenance.

AN IMMEDIATE EXPANSION of alumina production in Jamaica has been announced by Mr. N. V. Davis, president of Aluminium, Limited, Montreal. When expansion programmes are completed the capacity of Alumina Jamaica, Limited, will be increased to 543,000 tons of alumina per year. The present capacity is 230,000 tons; in March the company announced the start of construction to enlarge alumina capacity by 70,000 tons.

STRESSING THE NEED to revise one's ideas about the age limit for men in industry, Dr. Eric Thompson, principal of the Scottish College of Commerce, told the Institute of Industrial Supervisors in Glasgow that it had to be recognized that the nation was becoming older and that a man was young until he was 40, middle-aged until he was 65, and only old when his faculties were beginning to decline.

AUTOMOTIVE ENGINEERING, LIMITED, a subsidiary of Sheepbridge Engineering, Limited., located at Twickenham, announce the complete re-organization of their piston manufacturing departments. Machining and inspection sections have been equipped with the latest automatic and semi-automatic machinery capable of producing petrol and diesel-engine pistons to meet the exacting standards of modern engine design.

A TRAINING SCHEME for apprentices has been introduced by William Doxford & Sons, Limited, Sunderland, to attract more boys into the shipyard and to improve their technical knowledge. The scheme includes financial incentives for general progress and good conduct and awards for technical study. Mr. A. J. Thatcher has joined the company from the Richardsons Westgarth group as apprentice supervisor.

A FURTHER ORDER has been received by Ferranti, Limited, Hollinwood (Lancs), from Aluminium, Limited, Montreal, for three generator transformers for installation at the Alcan project at Kemano, British Columbia. The transformers are unique in that they will have aluminium windings. This order brings the transformers supplied or under construction by Ferranti for Alcan to 13 units of a total capacity of 648,000 kva.

MIDDLE-EAST oil-bearing countries were earning large incomes in sterling and dollars as a result of recent increases in production, stated Mr. Barry Kay, Regional Controller, Board of Trade, after a meeting of the London and South Eastern Board for Industry. As a result of this increased income, the import figures for these countries had risen sharply and they should rank high in the list of markets in which Britain should be able to achieve a notable export increase.

TEN senior French university scientists visited Britain last week to see something of British higher technical education and research and the application of research to industry. Their programme had been arranged by the British Council in conjunction with the Department of Scientific and Industrial Research, and included visits to the National Physical Laboratory at Teddington, and the works of the Metropolitan-Vickers Electrical Company, Limited, at Trafford Park, Manchester.

THE ASSOCIATION OF BRONZE & BRASS FOUNDERS announce that a dinner for area members will be held at the Grand Hotel, Charing Cross, Glasgow, on October 25, commencing at 6 p.m. It will be followed at 7.30 p.m. by an open "Advisory Service" meeting, when Mr. A. Talbot, of Western Foundries, will speak on the $CO_2$ Process and show a film. The president of the Association, Mr. W. T. Hobkirk, J.P., has expressed a wish to be present and will address the gathering during the course of the evening.

THE ANNUAL DINNER of the Institute of Welding will be held on Wednesday, November 2, at the Park Lane Hotel, London, W.1, the principal guest being Mr. F. J. ERROL, M.P., M.A., A.M.I.E.E., A.M.I.MECH.E., Parliamentary Secretary to the Ministry of Supply. The presidential address, by R E. G. Weddall, together with technical sessions, will be held at the Institution of Civil Engineers, Great George Street, London, S.W.1. The papers will all be devoted to various aspects of the inert-gas, arc-welding processes.

DR. D. J. URQUHART, of the Department of Scientific and Industrial Research, is advocating the establishment of a new public technical library service, based on an expansion of the present technical college libraries, to make expert information more readily available, especially to smaller firms. The idea has found enthusiastic support from the director of Special Libraries, Mr. Leslie Wilson, who believes that the fruits of research ought to be more readily accessible to smaller organizations. The Library Association is to discuss the suggestion.

A NEW MOULDED-PLASTIC IMPELLER has been developed by the General Electric Company, Limited, for the firm's 7½-in. Xpelair window fan. The moulded blade prevents amplification of any magnetic noise which may be present in the motor at certain speeds. At the same time the company has produced a light-proof attachment for both the 7½-in. and 9½-in. diameter fans so that they may be used in photographic darkrooms. This attachment consists of an aluminium black-out cowl which can be fitted over the bell-mouth entry of the fan.

THE FIRST of three 20,000-kw turbine-generator sets for the extensions to the Catalagzi power station in Turkey has been put on commercial load. This is

part of a £4,000,000 contract awarded to the Metropolitan-Vickers Electrical Export Company, Limited, Trafford Park, Manchester. It is expected that the other two units will be commissioned at three-monthly intervals. Babcock & Wilcox, Limited, was responsible for the boiler plant and auxiliary equipment. The station will eventually contain six such turbine-generator sets and six boilers, the first three having been installed by the Metrovick export company during 1948-49.

THE BRISTOL AND WEST OF ENGLAND branch of the Institute of British Foundrymen have arranged two meetings in Bristol on Saturday, October 22. The first is a special apprentices' meeting at 10.45 a.m., in the Bristol College of Technology, Ashley Down Road. Four films of an educational character dealing with various aspects of foundry practice will be shown. Then in the afternoon, at 3 p.m., in the Grand Hotel, members will hear the lectures postponed from last session, *viz.*, "Modern Green-sand moulding," by H. Haynes, and "Further Aspects of High-duty Cast Iron," by C. R. Van der Ben.

RECOMMENDATIONS from industrial firms and organizations nominating members to the Duke of Edinburgh's study conference on the human problems of industrial communities within the Commonwealth and Empire must reach the conference administrative headquarters at 48, Bryanston Square, London, W.1, by October 31. The total membership of the conference, which will be held at Oxford next year, will be 280, of which 90 places have been allotted to the United Kingdom. One half of these places will be given to managers and employers and the rest will be filled by trade unionists and operatives.

TREASURY DELAYS in granting financial and other facilities to an American concern may, it is stated, cost Scotland a factory at Tannochside, Lanarkshire, which was to have provided 1,500 jobs. Negotiations with the firm, the Caterpillar Tractor Company, of Peoria, Illinois, have been "bogged down" and there is a danger of the company turning elsewhere, possibly outside Britain. It is reported that difficulties arose over a sufficiently large loan to build a 1,000,000-sq. ft. factory; the proportion of profits the firm intends to transfer to America; and the raw materials and mechanical parts it wishes to import from there.

ANOTHER large order for sea-water evaporating and distilling plants has been received by G. & J. Weir, Limited, Cathcart, Glasgow. The new plants are for the Lobitos Oilfield in Peru, and have been ordered through Balfour, Williamson Merchant Shippers, Limited, of London, for delivery in 1956 and 1957. The first plant will provide 270 tons of fresh water a day from sea water, and the second 500 tons a day. These plants will supply all the fresh-water requirements of the oilfields, including that for domestic use. Weir's have made a specialty of this type of plant and in recent years have completed many contracts for large installations in many parts of the world, as well as providing equipment for ship use.

FOLLOWING A COUNCIL MEETING of the National Association of Non-Ferrous Scrap Metal Merchants, it was announced that Birmingham is to start courses for its scrap-metal merchants. Commenting on the scheme, Mr. Victor Brenner, a past-president of the Association, said that many firms were taking on men without previous experience, and these courses, which dealt with every aspect of the technical and commercial sides of the trade would be extremely valuable. Now that the industry had to pay out dollars for virgin metals, the recovery of all forms of scrap was a very important trade for the country. The courses, which begin next month, have been organized by Birmingham's education department, at the request of the trade.

PROVIDED DELIVERY DATES could be kept reasonably short, a large Canadian market awaited Scottish manufacturers of mining machinery. Their prices were favourable and their products were adaptable to Canadian mining methods. These points were emphasized at a press conference in Glasgow on October 6 by a Canadian Metal Mining Commission who have been examining potential supplies for the Canadian mining industry. Servicing was said to be of primary importance. British firms who had established branches in Canada and were providing warehousing and other essential facilities were doing good and increasing business. It was necessary, too, for a manufacturer to go out and "see the fellow who manages the mine."

THE BOARD OF TRADE are starting this month to collect hire-purchase statistics from shops and finance houses. Mr. Peter Thorneycroft, the President, has written to 6,000 retailers all over the country in trades where important sales of goods on hire-purchase terms are made (*inter alia*, for domestic appliances) inviting them to provide monthly information on their hire-purchase business. The President says: "As hire-purchase trading becomes more widespread, its influence on the economic well-being of the country becomes greater. It is therefore important that the Government should know how the volume of hire-purchase business is moving in order to take proper account of it in framing its broad economic policies."

THE Minister of Labour and National Service announces that, continuing the gradual reduction of the industrial hostels managed on his behalf by the National Service Hostels Corporation, he intends to close the remaining hostels as soon as possible within the next 12 months. When this has been done, the National Service Hostels Corporation will take steps to wind up its affairs. Industrial hostels originated early in the war to cater for workers in the munitions and other industries transferred from their homes to places lacking sufficient living accommodation. They have been used since the war to cater for workers transferred to work of major importance for national recovery. At the peak period of activity the Corporation was managing 74 industrial hostels with 28,000 residents. Last November the Minister announced his intention to reduce the 50 hostels then operating by about half. These have now been reduced to 22 and the number of residents has fallen from 13,700 to 7,500.

THE EFFECTS on human relations of technological innovations in industry and in the armed forces were compared by Mr. A. B. Waring, chairman of Joseph Lucas, Limited, in a speech at the annual conference at Harrogate of the Institute of Personnel Management from October 7 to 10. Technological change roused intense commotion in some industrial circles, Mr. Waring said, but one rarely heard of similar upsets in the Services. The reason is, Mr. Waring suggested, that management in industry consists of specialists in a variety of technical and administrative functions and man-management is often a secondary issue. In the services, on the contrary, an officer was rated primarily for his qualities as a leader of men. If this analysis were accepted, it could be taken for granted that the best human relations would exist in those factories where leadership qualities were high and were regarded as no less important than technical and administrative ability. Mr. Waring is chairman of the joint committee on human relations in industry of the Department of Scientific and Industrial Research and the Medical Research Council.

# Personal

Mr. FREDERICK PICKWORTH has been elected president of Vickers, Limited, London, S.W.1.

PROFESSOR ALBERT PORTEVIN, HON.M.I.B.F., has been made an honorary doctor of the Aachen Technical High School, Germany.

THE BRITISH TRANSPORT COMMISSION announce the appointment of Mr. J. B. PEILE, J.P., as a member of their Eastern Area Board.

MR. A. C. BREARLEY, B.MET., F.I.M., has joined the board of Catton & Company, Limited, steelfounders, Leeds, as technical director.

MR. H. J. G. GOYNS, who was recently president of the South African branch of the Institute of British Foundrymen, has been elected to a similar position with the Institution of Production Engineers.

MR. J. ROBERTSON, M.I.B.F., has been appointed to the staff of the Lerothi Technical School, Maseru, Basutoland. He was previously a lecturer at the Witwatersrand Technical College, Johannesburg.

THE assistant general manager of the Walker Naval Yard of Vickers-Armstrongs, Limited, Mr. R. J. W. RUDKIN, has been installed as chairman of the North-East Coast (Tyneside) branch of the Institute of Welding. He is 32.

THE CHAIRMAN of the Nobel division of Imperial Chemical Industries, Limited, Dr. J. CRAIK, has been appointed a director of Scottish Agricultural Industries, from whose board a former chairman of the division, Dr. J. W. MCDAVID, has retired.

AT A CEREMONY at the Park Works of David Brown & Sons (Huddersfield), Limited, on October 7, Mr. HUGH DILLON, who is still working for the firm at the age of 70, was given a birthday present of a cigarette case and lighter by his colleagues.

When Lord NUFFIELD visited Coventry on October 13, he was presented with an illuminated address recording the conferment on him of honorary membership of the City of Coventry Freemen's Guild. He received the address at a luncheon given by the Lord Mayor (Ald. T. H. DEWIS), the Guild's president.

EMPLOYEES of Herbert Terry & Sons, Limited, springmakers, etc., of Redditch (Worcs), have presented a plaque to the three directors, Mr. NORMAN TERRY, Mr. PHILIP TERRY, and Mr. DAVID TERRY, in recognition of their "past kindness." The directors have also received framed pictures of their predecessors, Alfred, Charles, and Victor Terry.

Mr. E. M. JOHNSON, formerly chief engineer of the plant department of the Metropolitan-Vickers Electrical Company, Limited, has been appointed consultant to the chief electrical engineer of the company. Mr. C. P. HOLDER has been appointed chief engineer of the large electrical machine department and Mr. H. I. WOOD assistant chief engineeer, turbo-generator engineering department.

THE TWO NEW DIRECTORS of Whessoe, Limited, Darlington, Mr. T. HESLOP and Mr. M. J. NOONE, will continue to hold their present managerial posts. Mr. Heslop is secretary of the company and, in addition, is responsible for the financial side of the business, while, as manager of operations, Mr. Noone is responsible for the whole of Whessoe's production and also for engineering development.

Mr. R. F. HANKS's duties as vice-chairman and a director of the Nuffield Organization are being taken over by Mr. J. R. WOODCOCK, who is deputy managing director of Morris Motors, Limited. Mr. Woodcock will now become deputy chairman of that company. Mr. Hanks will remain a director of the British Motor Corporation, Limited. Last July he was appointed chairman of the Western Area Board of the British Transport Commission and he will now be able to devote more of his time to the Board's activities.

AT THE RECENT Cliftonville conference of the Purchasing Officers' Association, MR. H. W. KING was elected president of the Association for 1955/56. Mr. King, as national honorary secretary, played a vital part in the Association's reorganization eleven years ago, when its fortunes were at a very low ebb and its membership was fewer than 500. Since those days, he has held every other major office in the Association, the membership of which is now nearly 4,000. (See also page 443 of this issue.)

MR. W. G. K. ALLEN, M.I.MAR.E., A.M.I.N.A., chairman and joint managing director of W. H. Allen, Sons & Company, Limited, was last week elected president of the British Engineers' Association. MR. E. W. THOMPSON, M.A., J.P. (chairman and a managing director of John Thompson, Limited) was elected vice-president of the Association and the retiring president, MR. H. S. "DICK" BROOM, M.B.E., B.SC., M.I.MECH.E. (joint managing director of Broom and Wade, Limited) was elected honorary treasurer.

NEW professorial chairs for civil, electrical, and mechanical engineering have been established at Sheffield University to replace the single Chair of Engineering, which was formerly held by Prof. H. W. SWIFT, who has retired. Mr. N. S. BOULTON has been appointed to the Chair of Civil Engineering and Mr. A. L. CULLEN, reader in electrical engineering and deputy supervisor of the research laboratories at University College, London, has been appointed to the Chair of Electrical Engineering. No appointment has yet been made to the Chair of Mechanical Engineering.

ENGLISH ELECTRIC COMPANY, LIMITED, was passing through a difficult period when Sir GEORGE H. NELSON became its managing director in 1930. However, under his guidance the firm has become an industrial group with a wide range of activities all over the world. Recently, Sir George, who has been chairman as well as managing director of English Electric since 1933, received presentations to mark his silver jubilee with the organization. At a ceremony at Trentham Gardens (Staffs), at which some 2,500 employees and their wives, many with more than 25 years' service with the concern, were present, he was given a set of Georgian silver and a hand-made leather-bound book containing the signatures of many thousands of the company's employees who had subscribed to a presentation fund.

# Obituary

Mr. JOHN ALFRED HINDHAUGH, manager of Harland & Wolff, Limited, Glasgow, died on October 6.

Mr. PERCY FREDERICK DEAKIN, formerly works director of Enfield Cables, Limited, died on October 7.

Mr. PERCY RICHARDSON, whose death is announced, was a director of the Weyburn Engineering Company, Limited, Elstead (Surrey), and of Foster, Yates & Thom, Limited, the Blackburn heavy precision engineers and boilermakers. He was also chairman and managing director of Thomas Try, Limited, metal depositors, of Hanwell, London, W.7.

TWW
MOULDERS' SUNDRIES
FOUNDRY COKES and COAL DUST
PIG IRONS, FOUNDRY & FORGE
MOULDING SAND
GANISTERS LIMESTONE and FLUORSPAR
BRUSHES SIEVES & RIDDLES
TONGS, SHANKS and LADLES
ANOTHER ASPECT OF TWW SERVICE
THOS W. WARD LTD
ALBION WORKS · SHEFFIELD
TELEPHONE: 24311 (22 Lines) · TELEGRAMS: "FORWARD, SHEFFIELD"
LONDON OFFICE: BRETTENHAM HOUSE · LANCASTER PLACE · STRAND · W.C.2

FS/14

# Book Review

**Story of a Modern University—A History of the University of Sheffield.** By Arthur W. Chapman. Published by the Oxford University Press, price 50s. net.

The reviewer is ill-equipped to give a balanced appreciation of Dr. Chapman's book, because as an ex-student he has followed the progress of the University since its inception, but perhaps not as an impartial observer. It is clear that in the old days, many of the key posts were held by outstanding personalities possessing but a sketchy academic background. Long experience has taught the reviewer that there are as many vested interests in educational affairs, as in business promotions. The reading of this book will help the layman serving on education committees to avoid some of the less obvious pitfalls.

The author, as the Registrar of the University, is obviously well-suited to write such a history. He takes the story back to the start of the various schools, which by integration formed first the University College and later the University. The abortive attempts to enter the now defunct Victoria University are set out in much detail, and the reader is left with the impression that in the long run, the final outcome would have been but little different. The order of the development was, first, largely by private philanthropy, secondly, by heavy local educational support, and finally dependence on the Exchequer to the extent of 70 per cent. of the necessary finance.

Perhaps the second phase was the most unhappy at Sheffield, when during the depression of 1930, negotiations had to be carried out with the not-too-co-operative local director of education. The book has been cleverly compiled by breaking it down into the obviously chronological periods, and by introducing therein, the progress of the various Faculties. Clearly it is metallurgy which will appeal most to JOURNAL readers, and this is easily traceable. Thus the foundry industry is told for the first time that the "Foundry Degree Course" as it was hopefully christened, "has been abandoned as a specialized curriculum, but its main principles have been embodied in the still more widely based courses now offered." So that's that, but the reviewer has no regrets. V.C.F.

---

### Vacuum-melted Antifriction Bearing Steels

Makers of antifriction bearings have long been aware that bearing life depends to a great extent on freedom of materials from inclusions and large carbide formations. In general, states a technician from the US General Motors Corporation in *Steel*, August 15, standard bearing steels having excessive inclusions give poor average bearing life; steels having an average of inclusions allow bearing life as published in catalogues; but steels classed as exceptionally clean and free from inclusions provide a bearing life 100 to 200 per cent. better than textbook ratings. Thus vacuum-melted standard ball and ring steels have shown test endurance consistently averaging about twice that of standard electric furnace steel, of similar analysis, when tested under identical laboratory conditions of heavy overloads at 130 deg. F. with oil-jet lubrication. However, at 400 deg. F. under the same loading and speed, vacuum-melted tool steel ball and ring materials of analysis 1 per cent. V, 0.65 C, 5 Cr and 5 Mo showed an increase in test life from 150 hrs. maximum for air-melted steel to an average of 1,080 hrs. for vacuum melted.

# Ironfounder's Appeal Allowed

An appeal by Henry Wallwork & Company, Limited, makers of repetition high-duty iron castings, of Manchester, from a judgment of Mr. Justice Havers at Manchester Assizes on March 22 last has been allowed in part by the Court of Appeal.

On December 10, 1952, the plaintiff, a Mr. Hodkinson, was employed in the company's works at Manchester, it was stated. He was operating a machine for cleaning metal castings when the machine stopped because a rope slipped off the pulley. Operators of the machines were not allowed to replace the rope. They had to report such a stoppage to the foreman, who would call the maintenance fitters to put the matter right. The plaintiff climbed up to the pulley, which was 9 ft. above the ground, and tried to put the rope back himself; in doing so his left hand was caught and he was seriously injured. He brought an action claiming damages from the defendants for common law negligence and for breach of statutory duty under section 13 of the Factories Act, 1937, because the rope and pulley constituted transmission machinery under that section and should have been fenced but were not.

Mr. Justice Havers dismissed the claim at common law, but held that there had been a breach of section 13. He held that the plaintiff himself had been negligent, and that each side must bear half the damages. In the result he awarded the plaintiff £1,376 15s.

The defendants appealed on the ground that in fact there had been no breach of the section; that even if there had been a breach it was not a cause of the accident; and that in any case the apportionment of damages was not correct.

Lord Justice Singleton found that the first two grounds of appeal failed. But as to the division of responsibility for the accident, if the plaintiff had not acted in defiance of the established practice the accident would never have happened. The apportionment must be altered to attribute 90 per cent. of the blame to the plaintiff himself and only 10 per cent. to the defendants. To that extent the appeal must be allowed.

Lord Justice Jenkins and Lord Justice Parker agreed.

---

## Dry Enamelling

Following a research on dry enamelling, carried out at the *Centre Technique des Industries de la Fonderie*, the following practical results were stated. Pickling having been used, some information is given about this process. To ensure proper adhesion of the enamel it is suggested:—

(1) For the sulphuric acid pickling, the following minimum times should be adhered to:—

Bath with 0.5 per cent. acid at 66 deg. Bé: 8 hrs.
Bath with 1.0 per cent. acid at 66 deg. Bé: 5 hrs.
Bath with 1.5 per cent. acid at 66 deg. Bé: 3½ hrs.

(2) This is to be followed by rinsing and brushing under running water, followed by neutralization.

(3) Avoid prolonged storage of the castings after the above processes.

(4) Avoid too high a furnace temperature (maximum 880 deg. C.) and too long a stay of the castings in the oven.

---

A PAMPHLET received from the British Oxygen Company, Limited, Bridgewater House, Cleveland Row, St. James's, London, S.W.1, describes "four ways of supplying oxygen to industry." They are by cylinders as liquid oxygen; by direct pipe-line, and by the installation of generating plants.

FIRST WITH W20

# BEETLE RESIN* W42

This new synthetic resin core-binder has been specially developed to suit those foundries where fumes and casting odours cause embarrassment. The result of practical co-operation between B.I.P. and leading foundries, Beetle W42 is another example of B.I.P.'s pioneer research and service to the Foundry Industry. W42 has been formulated with the Garrett Report in mind and it possesses all the advantages of Beetle Resin W20, coupled with this important new feature . . .

* *Patent Application 32896/58*

B·I·P

*rite for technical information to B.I.P. Chemicals Limited, Tat Bank House, Oldbury, Nr. Birmingham*

*London Office: 1 Argyll Street, W.1.* *'Beetle' is a trade mark registered in Great Britain and in most countries of the world.*

# Raw Material Markets

## Iron and Steel

More blast furnaces are now in production and pig-iron outputs are on an ascending scale. New units, with the furnaces being relined and repaired, which are to be brought into production later in the year will further increase available supplies. Most of the pig-iron being produced is taken up by the steelworks, which will also receive the bulk of the pig-iron from the new furnaces in course of construction when they are blown in.

Overall supplies of pig-iron still fail to satisfy the full needs of users of the different grades produced. Apart from the high-phosphorus irons, outputs invariably fall short of requirements. The steel trade, although receiving impressive tonnages representing about three quarters of the total production from home blast furnaces, still has to rely to some extent on supplies of imported basic pig-iron and hematite.

Expected increases in output should help to balance the position, and it is gratifying to learn that the authorities are paying attention to the need to provide a more evenly balanced supply of the foundry grades of iron.

The urgency of this question is apparent in the case of irons used in the production of high-duty castings by the general engineering and speciality foundries and, in particular, the low- and medium-phosphorus irons. For a long time when all available furnaces were in production outputs did not keep pace with demands, and now that a large furnace which supplied this grade of iron is out of production for relining and repair the supply position is extremely difficult. There are no signs of an alternative source of supply becoming available in the near future, and until the furnace now out of blast is producing again, foundries will continue to find it difficult, if not impossible, to obtain all the iron they need to meet the numerous orders they have on hand for home and export account. Meanwhile, they are taking up all the hematite pig-iron they can secure, as well as supplies of Scotch foundry irons, refined irons, and in some instances imported iron.

The light, jobbing, and textile foundries are much better situated so far as pig-iron supplies are concerned, although in some instances not so well off for business as other sections of the industry. Outputs of the high-phosphorus irons in average silicon contents appear to be more than adequate to meet current demands; in fact, it is learned that some export merchants have booked orders recently for this grade for shipment abroad.

There is a continued good demand for the heavier and better grades of cast-iron scrap.

The improved deliveries of steel semis from home and overseas sources have continued, and re-rollers are now better placed for supplies, although still handicapped by the shortage of labour. Demand for all finished steel products is in excess of the supply.

## Non-ferrous Metals

Further indications of an improving supply position for copper from the United States, reflected by a further lowering in the Custom smelters' price to 45 cents a pound, led to a decline in the London price at the close of last week. The market has not yet settled down, but the general opinion is that prices will not go much lower, because of the need to build up stocks, satisfy the present high consumption level, and, at the same time, to be prepared for re-entry of the US stockpile authorities into the market as buyers. A minority, mostly in the States, thinks that copper will have to fall back to 30 cents a pound (equivalent to £240 a ton) to be competitive with aluminium.

The better statistical position in the US is reflected in the latest figures issued by the Copper Institute. In September refined production reached a record level, at 138,880 short tons, against 98,732 tons in August. On the other hand, September deliveries of refined copper, at 144,571 tons, showed an increase of 55,000 tons over the previous month and were the largest to be reported since May, 1953.

At the beginning of this week the London Metal Exchange altered its basis of computing daily turnover by including tonnages "carried over." Thus, if one dealer buys from another dealer in the ring 100 tons of copper for cash and at the same time sells to the same dealer 100 tons of three months copper, this transaction will be recorded as 200 tons.

Tin remains a good market here and there are indications that this year's consumption, plus absorption by the US stockpile, will be in excess of production. The market is quieter in New York. In Indonesia, the Communist Party will almost certainly play a large part in future politics, which may have an unsettling effect.

The willingness of the US General Services Administration to buy offerings at 15½ cents a pound has ended the uncertainty affecting the lead market and provides a floor price for the metal. Demand in the States is good and stocks have now fallen to 26,859 short tons, against 72,150 tons a year ago. Demand over here remains steady.

Zinc has been a better market in the US. On Monday the Eagle-Picher Company initiated a ½ cent increase in the price of zinc to bring it to 13½ cents a pound. Supplies of special high-grade zinc in particular are tight.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* October 13, £353 10s. to £354; October 14, £346 to £347; October 17, £347 to £348; October 18, £353 to £354; October 19, £354 to £356.

*Three Months:* October 13, £345 10s. to 346; October 14, £337 10s. to £338 10s.; October 17, £336 to £337; October 18, £340 10s. to £341; October 19, £342 to £343.

TIN, Standard—*Cash:* October 13, £756 to £757; October 14, £754 10s. to £755; October 17, £757 10s. to £758; October 18, £760 to £761; October 19, £760 10s. to £761.

*Three Months:* October 13, £747 10s. to £748; October 14, £746 to £747; October 17, £746 10s. to £747 10s.; October 18, £748 to £749; October 19, £747 10s. to £748 10s.

LEAD—*First half October:* October 13, £106 15s. to £107; October 14, £106 10s. to £106 15s. *Second half October:* October 17, £107 to £107 5s.; October 18, £107 5s. to £107 10s.; October 19, £107 5s. to £107 10s. *First half January:* October 13, £106 10s. to £106 15s.; October 14, £106 5s. to £106 10s. *Second half January:* October 17, £106 15s. to £107; October 18, £107 to £107 5s.; October 19, £107 to £107 5s.

ZINC—*First half October:* October 13, £90 5s. to £90 10s.; October 14, £90 7s. 6d. to £90 10s. *Second half October:* October 17, £90 15s. to £91; October 18, £91 15s. to £92; October 19, £91 10s. to £91 15s.

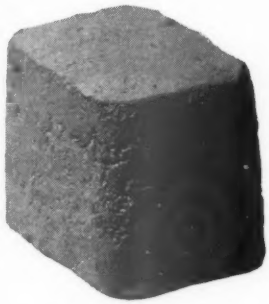
*First half January:* October 13, £90 5s. to £90 10s.; October 14, £90 7s. 6d. to £90 10s. *Second half January:* October 17, £90 10s. to £90 12s. 6d.; October 18, £91 10s. to £91 15s.; October 19, £91 5s. to £91 10s.

F.&M.
REGD. TRADE MARK

# SILICON AND MANGANESE BRIQUETTES

## FOR SOFTENING AND REFINING CAST IRON

F. & M. SILICON BRIQUETTE



F. & M. MANGANESE BRIQUETTE

For the past fourteen years, F. & M. Supplies Ltd. have provided in their Ferro Silicon Briquettes a practical, convenient and economical means of increasing the amount of silicon in a cast iron. The necessary number of Briquettes is added to the charge in the cupola and all the silicon contained in the briquettes passes into the molten metal with only a negligible loss because the alloy is protected during its progress through the oxidizing zone. An important function of F. & M. Silicon Briquettes is the production of dense iron castings.

Many cupola charges require the addition of manganese to combine with the sulphur and form the comparatively innocuous manganese sulphide. Manganese is also needed in the production of cast iron having a medium tensile strength and is essential when a steel scrap is incorporated in the charge.

**IN SOME CASES THE SIMULTANEOUS ADDITION OF SILICON AND MANGANESE IS NECESSARY AND F. & M. SILICON AND MANGANESE BRIQUETTES FORM AN IDEAL COMBINATION FOR THIS PURPOSE.**

*MANUFACTURED IN LONDON*
*BY:*

**F. & M. SUPPLIES LTD**

4, BROAD STREET PLACE, LONDON, E.C.2
Telephone: LONDON WALL 7222 (4 lines)
*FACTORY:* CONCORDIA WORKS, LONDON, E.14.

Technical advice for any special working conditions gladly given on request.

FOUNDRY & METALLURGICAL F.&M.S.LTD.

*Manufacturers also of:*
SILICOMANGANESE AND FERRO CHROMIUM BRIQUETTES

# Current Prices of Iron, Steel, and Non-ferrous Metals

*(Delivered unless otherwise stated)*

**October 19, 1955**

## PIG-IRON

**Foundry Iron.**—No. 3 IRON, CLASS 2:—Middlesbrough, £17 1s. 0d.; Birmingham, £16 13s. 3d.

**Low-phosphorus Iron.**—Over 0.10 to 0.75 per cent. P, £18 12s. 9d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £19 8s. 3d.

**Scotch Iron.**—No. 3 foundry, £19 5s. 6d., d/d Grangemouth.

**Cylinder and Refined Irons.**—North Zone, £21 3s. 0d.; South Zone, £21 5s. 0d.

**Refined Malleable.**—P, 0.10 per cent. max.—North Zone, £22 0s. 0d.; South Zone, £22 3s. 0d.

**Hematite.**—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent. :—N.-E. of England (local iron), £19 5s.; Scotland (Scotch iron), £19 11s. 6d.; Sheffield, £20 12s. 0d.; Birmingham, £20 19s. 6d.; Wales (Welsh iron), £19 11s. 6d.

**Basic Pig-iron.**—£16 16s. 6d. all districts.

## FERRO-ALLOYS

*(Per ton unless otherwise stated, delivered)*

**Ferro-silicon** (6-ton lots and over).—45 per cent. Si, £43 15s. 0d., scale 15s. per unit; 75 per cent. Si, £65 0s. 0d., scale 16s. per unit.

**Ferro-vanadium.**—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

**Ferro-molybdenum.**—65/75 per cent., carbon-free, 11s. 0d. per lb. of Mo.

**Ferro-titanium.**—20/25 per cent., carbon-free, £230 0s. 0d.; 38/40 per cent., £279 0s. 0d.

**Ferro-tungsten.**—80/85 per cent., 18s. 5d. per lb. of W.

**Tungsten Metal Powder.**—98/99 per cent., 21s. 5d. per lb. of W.

**Ferro-chrome** (6-10 ton lots).—4/6 per cent. C, £85 0s. 0d. to £90 0s. 0d., basis 60 per cent. Cr, scale 25s. 0d. to 30s. 0d. per unit; over 6 per cent. C, £82 0s. 0d. to £86 0s. 0d., basis 60 per cent. Cr, scale 24s. 0d. per unit; 2 per cent. C* 1s. 11¾d. per lb. Cr.; 1 per cent. C,* 2s. 0¼d. per lb. Cr; 0.15 per cent. C,* 2s. 2½d. per lb. Cr; 0.10 per cent. C,* 2s. 2¾d. per lb. Cr; 0.06 per cent. C,* 2s. 3d. per lb. Cr.

**Metallic Chromium.**—98/99 per cent., 7s. 0d. to 7s. 6d. per lb.

**Metallic Manganese.**—93/95 per cent., carbon-free, £249 0s. 0d.; 96/98 per cent., £269 0s. 0d.

**Ferro-columbium.**—60/75 per cent., Nb + Ta, 28s. per lb., Nb. + Ta.

**Ferro-manganese** (home).—78 per cent., £54 10s. 0d.

## SEMI-FINISHED STEEL

**Re-rolling Billets, Blooms, and Slabs.**—BASIC: Soft, u.t., £26 19s. 0d.; tested, 0.08 to 0.25 per cent. C, £27 19s. 0d.; hard (0.41 to 0.60 per cent. C), £29 5s. 6d.; silico-manganese, £36 7s. 6d.; free-cutting, £31 0s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £34 12s. 0d.; silico-manganese, £36 7s. 6d.

* Average 68-70 per cent.

**Billets, Blooms, and Slabs for Forging and Stamping.**—Basic, soft, up to 0.25 per cent. C, £31 11s. 0d.; basic, hard, over 0.41 up to 0.60 per cent., C, £32 13s. 6d.; acid, up to 0.25 per cent. C, £35 12s. 6d.

## FINISHED STEEL

**Heavy Plates and Sections.**—Ship plates (N.-E. Coast), £33 1s. 6d.; boiler plates (N.-E. Coast), £35 11s. 6d.; floor plates (N.-E. Coast), £34 10s. 6d.; sectional material, N.-E. Coast, £30 19s. 6d.

**Small Bars, Sheets, etc.**—Rounds and squares, under 3 in., untested, £33 19s. 6d.; flats, 5 in. wide and under, £33 19s. 6d.; hoop and strip, £35 1s. 6d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £36 5s. 0d.; black sheets (hand mill), 17/20 g., £46 13s. 6d.; galvanized corrugated sheets, 24 g., £58 11s. 0d.

**Alloy Steel Bars.**—1 in. dia. and up: Nickel, £58 0s. 3d.; nickel-chrome, £81 10s. 0d.; nickel-chrome-molybdenum, £92 7s. 6d.

## NON-FERROUS METALS

**Copper.**—Cash, £354 0s. 0d. to £356 0s. 0d.; three months, £342 0s. 0d. to £343 0s. 0d.; settlement, £356 0s. 0d.

**Copper Tubes, etc.**—Solid-drawn tubes, 3s. 4d. per lb.; rods, 387s. 6d. per cwt. basis; 20 s.w.g., 420s. 9d. per cwt.

**Tin.**—Cash, £760 10s. 0d. to £761 0s. 0d.; three months, £747 10s. 0d. to £748 10s. 0d.; settlement, £761 0s. 0d.

**Lead (Refined Pig).**—Second half October, £107 5s. 0d. to £107 10s. 0d.; second half January, £107 0s. 0d. to £107 5s. 0d.

**Zinc.**—Second half October, £91 10s. 0d. to £91 15s. 0d.; second half January, £91 5s. 0d. to £91 10s. 0d.

**Zinc Sheets, etc.**—Sheets, 15 g. and thicker, all English destinations, £122 5s. 0d.; rolled zinc (boiler plates), all English destinations, £120 0s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £103 0s. 0d.

**Brass Tubes, etc.**—Solid-drawn tubes, 2s. 7½d. per lb.; rods, drawn, 3s. 5½d.; sheets to 10 w.g., 340s. 6d. per cwt.; wire, 3s. 3½d.; rolled metal, 326s. 3d. per cwt.

**Brass (Brazing).**—BS1400, B3 (65/35), £213; B6 (85/15), — BS249, —.

**Brass (High Tensile).**—BS1400, HTB1 (30 tons), £270; HTB2 (38 tons), —; HTB3; (48 tons), —.

**Gunmetal.**—RCH, 3/4 per cent. tin, —; BS1400, LG2 (85/5/5/5), £307; LG3 (86/7/5/2), £313; G1 (88/10/2/¼), £382; (88/10/2/1), £374.

**Phosphor Bronze.**—BS1400, PB1 (AID released), £395 per ton.

**Phosphor Bronze Strip, etc.**—Strip, 477s. 0d. per cwt.; sheets to 10 w.g., 500s. 0d. per cwt.; wire, 4s. 10½d. per lb.; rods, 4s. 2½d.; tubes, 4s. 1d.; chill cast bars: solids 4s. 3½d., cored 4s. 4½d. (CHARLES CLIFFORD, LIMITED).

**Nickel Silver, etc.**—Rolled metal, 3 in. to 9 in. wide × 0.056, 4s. 2½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 7½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 6½d. All prices are net.

**Other Metals.**—Magnesium, ingots, 2s. 4d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £91 0s. 0d. to £91 10s. 0d. Nickel, £519 0s. 0d. Aluminium, ingots, £171 0s. 0d.; aluminium bronze (BS1400), AB1, £360; AB2, £369 Solder, brazing, BS1945' 3s. 0½d. lb.; granulated, 3s. 4d. lb.

# Forthcoming Events

OCTOBER 24

**Institution of Works Managers**

*Glasgow branch:* "Industrial Engineering: What it is, and What is its Function?" by D. J. Lockyer, 7.30 p.m., at the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent.

OCTOBER 25

**Institution of Production Engineers**

*Oxford section:* "Automation in the Aluminium Industry," by D. A. Ellis, followed by film, the "Kittimat Story," 7.30 p.m., at the North Oxfordshire Technical College and School of Art, Bath Road, Banbury.

**Incorporated Plant Engineers**

*South Wales branch:* "Safety in Industry," by F. W. Thompson, 7.15 p.m., at the South Wales Engineers Institute, Park Place, Cardiff.

OCTOBER 26

**Institute of British Foundrymen**

*London branch:* "Co-operation between Engineer and Founder on Casting Design," by G. Blanc and M. Jaumain (of the *Centre Technique des Industries de la Fonderie*, France); 7.30 p.m., at the Waldorf Hotel, W.C.2.

*Birmingham branch:* "Fluidity Testing Developments," by V. Kondic, B.Sc., Ph.D., 7.30 p.m., at the James Watt Memorial Institute.

**Institute of Industrial Supervisors**

*Mid-Somerset section:* "First Principles of Foremanship," by H. C. Dyer, 7.30 p.m., at J. Bibby & Sons, Bridgwater.

**Institution of Production Engineers**

*Coventry graduate section:* Production Panel—Discussions on Some Aspects of Production Engineering, 7.15 p.m., at the Craven Arms, High Street.

*Shrewsbury section:* "Industrial Applications of Electrical Appliances," by P. L. B. Buckley, B.Sc., and S. L. Robinson, 7.30 p.m., at the Walker Technical College, Oakengates.

OCTOBER 27

**Institute of British Foundrymen**

*Southampton section:* "Metal Melting Furnaces and Hot-blast Cupolas," by F. C. Evans, F.I.M., 7.30 p.m., at the Technical College, St. Mary's Street.

**Northampton Polytechnic**

*Department of Applied Chemistry:* Special Foundry Course—IV: "Foundry Sand Control," by Dr. J. E. Garside, 7 p.m., at St. John Street, London, E.C.1.

**Foundry Trades Equipment and Supplies Association Limited**

Annual general meeting, 2.30 p.m., at the Waldorf Hotel, London, W.C.2.

**Incorporated Plant Engineers**

*Sheffield and district branch:* "Dust Generation and Control in Foundries," by W. H. White, 7.30 p.m., at the Grand Hotel, Sheffield.

**Institute of Industrial Supervisors**

*North Gloucestershire section:* "Factory Morale and Discipline under Full Employment," by L. Leonard, 7.30 p.m., at the Town Hall annexe, Cheltenham.

**Institute of Fuel**

*Midland section:* "Impact of Refractory Materials on the Efficient Use of Fuel," by Dr. A. T. Green, 6 p.m., at the James Watt Institute, Great Charles Street, Birmingham, 3.

OCTOBER 28

**Institute of British Foundrymen**

*East Anglian section:* Dinner and social evening, 7 for 7.30 p.m., at the Oriental Café, Westgate Street, Ipswich.

*Falkirk section:* "Visit to Italian Foundries," by J. Ferguson, and "Visit to German Foundries," by D. McK. Webster, 7.30 p.m., at the Temperance Café, Lint Riggs.

**Institution of Mechanical Engineers**

"Value of the Notch Tensile Test," by Prof. J. F. Baker, O.B.E., Sc.D., and C. F. Tipper, Sc.D., followed by discussion, 5.30 p.m., at 1, Birdcage Walk, Westminster, S.W.1.

LOW PHOSPHORUS
REFINED & CYLINDER
HEMATITE
MALLEABLE
DERBYSHIRE
NORTHAMPTONSHIRE
SWEDISH CHARCOAL

PIG-IRON

WILLIAM JACKS & CO. LTD.
LONDON, E.C.2.
Winchester House, Old Broad Street
London Wall 4774 (6 lines)

FERRO SILICON 12/14%
ALLOYS & BRIQUETTES
N.F. METALS & ALLOYS
LIMESTONE
GANISTER
MOULDING SAND
REFRACTORIES

*And at:—*

BIRMINGHAM, 2. 39, Corporation St., Midland 3375/6
LIVERPOOL, 2. 13, Rumford St., Central 1558
GLASGOW, C.2. 93, Hope Street, Central 9969

# CLASSIFIED ADVERTISEMENTS

**PREPAID RATES:** Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Numbers 2/6 extra (including postage of replies.) Situations Wanted 2d. per word.

**Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.**

## SITUATIONS WANTED

BOY (17 years), Grammar School education, wishes to learn Non-ferrous Foundry Business. Small premium if desired.—Box BG567, FOUNDRY TRADE JOURNAL.

EXPERIENCED FOUNDRY FOREMAN, non-ferrous, 10 years' supervision, experienced in jobbing and mechanical production, training of unskilled labour.—Box EF569, FOUNDRY TRADE JOURNAL.

YOUNG FOUNDRYMAN (33), apprentice trained engineer, with 7 years' jobbing moulding, seeks employment where accommodation is obtainable. Anything considered. — Box YF576, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN (37), with only 8 years' non-ferrous foundry experience, desires change, with prospects. At present chargehand in small modern foundry.—Box FW580, FOUNDRY TRADE JOURNAL.

IRONMOULDER (36), 22 years' experience, dry sand, green sand, requires vacancy with housing accommodation. Box IM585, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER (46) Free. Accustomed to castings up to 30 tons weight for machine tool, sugar machinery, marine, textile. Practical, Technical. Cupola Control, Mechanisation, Sole Control. M.I.B.F. Economic results guaranteed, "Anywhere." FM564, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN/METALLURGIST, age 31, A.M.I.B.F., City and Guilds and O.N.C. Mech., desires post as ASSISTANT MANAGER, or similar status. Skilled moulder, and experienced in all branches of foundry work.—Box FM570, FOUNDRY TRADE JOURNAL.

## SITUATIONS VACANT

*The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged* 18-64 *inclusive or a woman aged* 18-59 *inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order,* 1952.

MILLBROOK ENGINEERING COMPANY, Landore, Swansea, requires METALLURGIST with experience in casting of Chilled Cast Iron and/or Alloy Rolls. Age 35/45. Pension scheme.

WANTED, FOREMAN for machine section of a partly mechanised Iron Foundry.—Applications, by letter, should be sent to MANLOVE ALLIOTT & CO., LTD., Engineers, Nottingham, stating age and qualifications and salary required.

## SITUATIONS VACANT—*contd.*

### DEVELOPMENT ENGINEER.

A LARGE Public Company, with associated factories, requires a capable ENGINEER, with mechanical engineering qualifications and some knowledge of electrical applications, to apply creative ability in the design and development of extensive metal working plant and layouts and all services and ancillaries. Should be under 35, and have had mechanical engineering education to degree standard, with general works and D.O. experience and sound basic knowledge of the application of electrical power. Any necessary training and further experience will be provided with a view to taking over responsibility for the operation of an important and expanding department engaged in development work and methods improvements. The appointment will be permanent and pensionable, of senior status, with bonus participation and excellent prospects of rapid advancement and widening scope, situated at the main works located in attractive country district in N. Midlands; some accommodation is now available, and assistance will be given in arranging other accommodations as required. All applications will be treated as confidential.—Please reply fully to Box DE545, FOUNDRY TRADE JOURNAL.

GENERAL MANAGER required for modern Steel Foundry on North-East Coast.

Must have experience in modern developments of Steel Foundry work.

Good salary and pension scheme, with excellent prospects for promotion.

Applications, which will be kept strictly confidential, giving age, salary required, and experience, should be addressed to the MANAGING DIRECTOR, Blackett, Hutton & Co., Ltd., Guisborough, Yorkshire.

FOUNDRY TECHNICIAN, aged 25—30, required for heavy non-ferrous foundry in North West handling specialised product. Shop experience not essential if possessing good technical training and ability to study melting and moulding methods. Good prospects, salary about £550 per annum plus bonus. Pension scheme. Box FT540, FOUNDRY TRADE JOURNAL.

NON-FERROUS FOUNDRY MANAGER (Directorship later) required, preferably experienced technically and commercially in centrifugal casting. Exceptional remuneration and an interest in financial results.—Apply in confidence, CHAIRMAN, Metals & Alloys, Ltd., Minworth, Birmingham.

## SITUATIONS VACANT—*contd.*

YOUNG Men (min. age 24 years) required for Sand Control in Steel Foundry. Sound knowledge of testing of both naturally bonded and synthetic sands desirable.—Write, giving details of qualifications, age, experience, etc., to WORKS METALLURGIST, Brown Lenox & Co., Ltd., Pontypridd, Glam.

CHIEF METALLURGIST required for Mechanised Grey Ironfoundry producing 150 tons per week of small/medium grey and high duty iron castings. The position carries full responsibility for the control of laboratory, metals, sands and their processing; is a senior staff appointment with commensurate salary (£1,000–£1,200) bonus, and pension.—Box CM534, FOUNDRY TRADE JOURNAL.

PATTERNMAKERS, used to first-class Wood and Metal work, required by Coventry firm of Master Patternmakers. Top wages and excellent conditions.—Box PU571, FOUNDRY TRADE JOURNAL.

GRAVITY DIECASTINGS.—Situation vacant for chargehand Aluminium gravity DIECASTER in expanding North-West concern. Pay according to experience and ability. Good opportunity for advancement.—Box GD577, FOUNDRY TRADE JOURNAL.

TIME AND MOTION STUDY ENGINEER required for modern Ferrous and Non-ferrous Foundry in New Town. Applicants must have had training and experience in this work, backed by practical foundry experience. Successful applicant may be nominated for housing.—Write, giving details of age, experience, and salary required, to WELFARE OFFICE, A.P.V.-Paramount, Ltd., Manor Royal, Crawley, Sussex.

FOUNDRY FOREMAN wanted for South West Lancs. Green sand, dry sand and loam up to 12 tons. Non-ferrous up to 3—4 tons. Seventy employed. State age, experience and salary required, to Box FF574, FOUNDRY TRADE JOURNAL.

FOUNDRY PRODUCTION MANAGER. A well known engineering firm situated in North East England, operating jobbing and repetition foundries, invites applications for the position of FOUNDRY PRODUCTION MANAGER. The company is engaged in the production of high duty irons in loam green and dry sand and by the carbon dioxide and shell processes, and the position offered, carries considerable responsibilities in the fields of production, metallurgical and production control. Pension scheme. Maximum assistance given in obtaining accommodation.

Applicants who should be 30—40 years of age are asked to send full details of experience, age, and salary required to Box FP587, FOUNDRY TRADE JOURNAL.

FOREMAN, aged 30/40, required for London Iron Foundry. Production about 70/80 tons per month, jobbing and machine. Housing facilities not available. Give full details of age, experience and salary required to Box FA586, FOUNDRY TRADE JOURNAL.

## SITUATIONS VACANT—contd.

ASSISTANT MANAGER required for Iron Foundry producing Machine Tool and Pressure Castings in outer London area. Applicants should have sound technical knowledge and organising ability, with experience of quantity core and mechanised moulding production.—Box AM582, FOUNDRY TRADE JOURNAL.

FOUNDRY ENGINEER required for West of England Foundry. Must be capable of taking full control of Foundry Buildings and Plant, some electrical knowledge desirable. Apply, giving details of experience, age, and salary required.—Reply to Box FE583, FOUNDRY TRADE JOURNAL.

SKILLED MOULDERS required for modern South-East Coast Jobbing Foundry. Ideal working conditions by the sea.—Box SM584, FOUNDRY TRADE JOURNAL.

CATTON & CO., LTD., of Leeds, require a YOUNG MAN (National Service obligations completed) as ASSISTANT in their METHODS Department. Ability to read casting drawings essential, foundry experience, and a good level of education is desirable. This is an excellent opportunity for a young technician to broaden his experience in the carbon and alloy steel casting fields, and has good future possibilities.—Replies, stating details of education and experience, to CATTON & CO., LTD., 29, Chadwick Street, Leeds, 10.

### FOUNDRY SENIOR FOREMAN.

THE British Northrop Loom Company, Limited, Blackburn, has a vacancy for a practical man aged about 35—40 in large modern Foundry producing up to 200 tons weekly of light and medium castings for own product.

Applicants should be time served moulders, experienced in modern methods of production. They should have sound knowledge of cupola practice, loose pattern and machine moulding methods for ferrous and non-ferrous castings.

The post covers direct responsibility on the Foundry floor and is intended to be permanent with prospects of promotion later. Commensurate salary and generous pension scheme. Apply to the WORKS MANAGER.

WORKS ENGINEER required to take charge of maintenance and installation of foundry plant (mechanical and electrical). Qualification not less than H.N.C. standard (A.M.I.Mech.E. preferred) and actual experience with similar type of heavy plant. Four figure salary to suitable man. Preferred age, 35/40. Apply in confidence to WORKS MANAGER, Wm. Mills Ltd., Friar Park, Wednesbury, Staffs.

FOUNDRY MANAGER required for Modern Semi-Mechanised Brass-foundry in the Birmingham area. Applicants must have practical and technical knowledge in the production of Brass and Gun Metal Castings, and possess knowledge of Core-Blowing equipment. Excellent position for the right person.—Write, giving full details and copies of testimonials, Box FM572, FOUNDRY TRADE JOURNAL.

SENIOR FOREMAN to operate mechanised section of North Midland iron foundry. Should be experienced in both batch and continuous production of a wide range of machine moulded castings. Progressive, superannuated post with housing accommodation for suitable man. Box SF558, FOUNDRY TRADE JOURNAL

METAL PATTERNMAKER wanted; accustomed to making small patterns in brass and white metal. W.R. of Yorks. House available. Box MP553, FOUNDRY TRADE JOURNAL.

## AGENCY

FOUNDRYMAN and Metallurgist would like an Agency for Metals or Castings. Eighteen years' sales experience.—Box FA581, FOUNDRY TRADE JOURNAL.

## FOUNDRY FOR SALE

LANCASHIRE Iron Foundry for sale—machine, plate and loose patterns moulding. Machine shop facilities available. Box LI560, FOUNDRY TRADE JOURNAL.

## BUSINESS OPPORTUNITIES

MANAGING DIRECTOR of Grey Iron Foundry invites inventors and/or originators with sound workable ideas to contact him, any development of such ideas will include full participation for the originator. Box MD561, FOUNDRY TRADE JOURNAL.

CONTROLLING Interest in small Foundry (ferrous and non-ferrous) for Sale. Approx. 5,000 sq. ft. Freehold. Surrey area. Box CS565, FOUNDRY TRADE JOURNAL.

## FOUNDRY FOR RENT

NON-FERROUS Foundry near London fully equipped for sand and die casting. At present employing 30 people. Can be rented as a going concern for any period exceeding one year. Box NF555, FOUNDRY TRADE JOURNAL.

## MACHINERY WANTED

CRANE Weigher Salter No. 99 or similar. 10 cwts. capacity in 7 lb. divisions; also Centriblast Shotblast Barrel Cleaner, either Spencer and Halstead or Tilghmans. Box CW566, FOUNDRY TRADE JOURNAL.

WANTED.—5/6 tons per hour Cupola required, preferably with self-charging gear, etc.—Details Box WT578, FOUNDRY TRADE JOURNAL.

REASONABLY modern Electric Overhead Travelling Crane wanted, about 50 ft. span 20 tons capacity.—Box RM546, FOUNDRY TRADE JOURNAL.

URGENTLY required.—Two M55 Pressure Die Casting Machines, air operated. Good condition essential. SCOTT & STEWART CASTING CO., 85, Grove Road, Windsor 1987.

WANTED.—Small Brass Furnace. Morgan Miniature or similar. 8, Upper Jackson Street, Hulme, Manchester, 15.

BAND Saw—multiple speed. 24 in. wheels or over. Must be in first class condition. Box BS563, FOUNDRY TRADE JOURNAL.

## MACHINERY FOR SALE

SAVE POUNDS!!! in equipping to meet the New Regulations. New powerful Motorised Dust, Fume Extractor-Blower Units. £23 10s. 6d. Numerous satisfied users. Literature available.—BELLANGERS, 306, Holloway Road, London, N.7. North 4117.

## MACHINERY FOR SALE—contd.

FOR Sale—One Polygram Mark 1V G Automatic Shell Mould Maker, complete with eight pattern carriers. This machine has been in use only approximately five months and is in good condition, having been frequently serviced by the manufacturers. Box FS559, FOUNDRY TRADE JOURNAL.

NO. 2 Size August's Composite Sand Plant, complete with motors, consisting of two sections:—

(*a*) Cleaning Plant with Rotary Screen, Reciprocating Screen, Dust and Silt Removal Unit (Musgrave's), Magnetic Separator, Elevator Storage Hopper.

(*b*) A Sand Mixing and Aerating Section consisting of Bucket Loader, August's intensive Foundry Sand Mixer and August's Aerator. Considerable amount of spares available and can be seen when viewing plant.

1-Ton Rotary Furnace (Stein & Atkinson, Ltd.) complete with Motors, Fan and Recuperator. Gas-fired, can be altered to oil-firing. Spare Shell.

1 NVP.3 Shot Blast Apparatus fitted with Cyclone separator 5 ft. dia. × 3 ft. 6 in. deep and WT.2 Moisture Trap. Box NS575, FOUNDRY TRADE JOURNAL.

**ITEMS FOR SALE—CHEAP FOR QUICK CLEARANCE.**

NEW Motorised Band Saw.

New Double-ended high Speed Grinder, 24 in. dia. wheels, pedestal type, with AC 3-phase motor, vee-belt drive, self contained in base.

400 lbs. coke-fired Tilting Furnace, as new.

Molineux Power Moulding Machines, new 1947 £95 each.

Sand Mill 4 ft. dia., nearly new.

Large stock Bale-out Furnaces.

Several Morgan Tilting Furnaces.

Broomwade Compressors and Air Receivers in stock

"ADAPTABLE" Electric Portable riddle.

Three "AUGUSTS" drawer-type coke-fired core ovens, as new.

Heavy Git Cutter by James Evans.

New Vortec Mixers in stock.

Several good shotblast barrel plants.

**ELECTROGENERATORS LTD., Australia Road, Slough. Telephone Slough 22877**

**SHOTBLAST MACHINES**

**All sizes. Rooms or cabinets. Ex stock or prompt delivery. Low prices.**

*Try us for*

**Spare parts & tungsten carbide nozzles.**

***Fully Illustrated Catalogue free on request.***

**Actual Manufacturers**

**ELECTROGENERATORS LTD.**

**AUSTRALIA ROAD, SLOUGH**

**Telephone: SLOUGH 22877**

***Over 30 years of satisfactory service***

## MACHINERY FOR SALE—*contd.*

GAS-FIRED Hot Air Mould Dryer, by Modern Furnaces & Stoves, Ltd. Fan motor, 375 V., 3-phase, 50 cycles. Practically unused. Prepared accept low offer as space needed.—Box GF579, FOUNDRY TRADE JOURNAL.

DEXTER Hand Toggle Moulding Press for Sale. Bed 24 in. by 24 in., daylight 19 in. Photograph available.—F. J. EDWARDS, LTD., 359, Euston Road, London, N.W.1.

TWN

RD.3 JOLT SQUEEZE TURNOVER MOULDING MACHINE B.M.M., 900 lb. jolting load, 12 in. pattern draw. Table 36 in. × 25 in.

HPL2 JOLT SQUEEZE STRAIGHT DRAW MOULDING MACHINE BY BRITISH MOULDING MACHINE CO., 400 lb. jolting load; 9 in. pattern draw; table approx. 30 in. × 21 in.

COLEMAN-WALLWORK TYPE R.2 CARTRIDGE CORE BLOWER, suitable for Core Boxes up to a maximum of 14 in. × 17 in. × 10 in., 400 lb. drum capacity.

48 in. × 30 in. "ROPER" RUMBLING BARREL with Balanced Dust Hood, Fast and Loose Pulley Drive.

"MUMFORD" PLAIN JOLT RAM MOULDING MACHINES, table 30 in. × 20 in., 1,500 lb. cap., cyls. 6 in. dia., w.p. 80/100 lb. p.s.i.

SHOT BLAST ROOM PLANT by TILGHMAN, 7 ft. × 8 ft. ×8 ft. high, turntable 7 ft. dia., pressure chamber, bucket elevator system, dust extraction cabinet, etc.

SHOT BLAST CABINET by JACKMAN, approx. 40 in. wide × 32 in. deep × 40 in. high, swing door 30 in. wide, dust extraction cabinet, etc.

SELF-CONTAINED SHOT BLAST CABINET by SPENCER-HALSTEAD, 3 ft. cube, balanced door, pressure chamber, built-in dust arrester, fan, etc.

HPL2 JOLT SQUEEZE STRGT, DRAW MOULDING MACHINE, by B.M.M., 400 lb. load, table 30 in. × 21 in., stroke 8 in.

OSBORNE type 601 JOLT RAM PATTERN DRAW MOULDING MACHINE by JACKMAN, boxes 24 in. × 24 in., table approx. 30 in. × 24 in., pattern draw 10 in.

SEVERAL WT. 562D JOLT SQUEEZE TURNOVER DRAW MOULDING MACHINES by C-WALLWORK, 1,100 lb. load, pattern draw 14 in., table 51 in. × 36 in. stroke 12 in., split swing heads, valves, control tower, etc.

"LINSLADE" AUTO. SAND SLINGER by FOUNDRY EQUIPMENT, 10 ft. radius arm: 10 h.p. motor, 400/3/50, bucket, elevators, etc.

RUMBLING BARRELS, FURNACES, RIDDLES, AIR COMPRESSORS, LADLES available from stock.

**THOS. W. WARD LTD.**
**ALBION WORKS · SHEFFIELD**
'Phone: 26311 'Grams: "Forward" LONDON
**BRETTENHAM HOUSE, STRAND, W.C.2.**

'Phone TEMple Bar 1515 (12 lines.)

*Remember . Wards might have it!*

## MACHINERY FOR SALE—*contd.*

ONE B.M.M. R.D.5 Moulding Machine for Sale. New 1952. Little used. Offers invited.—H. J. CREESE & SONS, LTD., Church Hill Foundry, Thurmaston, Leicester.

"MINOR" Sand Rammer by F.E. Co. Sand Mill motorised, 4 ft. 6 in. rotating pan with 3-paddle agitator and skip loader.
Sand Mill, 5 ft. dia. pan.
Ditto. 12-ton, continuous.
MOULDING MACHINES:—
B.M.M. Hand Squeeze TO3. turnover table, 30 × 20.
Hilltop Hand Squeeze, pin lift.
F.E. Co.'s Hand Squeeze, 18 in. × 22in.
B.M.M. Snap Flask, 16 in. × 18 in.
ADAPTABLE Hand Ram: turnover table.
B.M.M. SSI. Jolt Squeeze turnover, jolt load 800-lbs. Table, 2 ft. 6 in. × 1 ft. 10½ in.
FURNACES:—
600-lbs. Morgan O.F. C.A. tilting (2) with motorised blower.
600-lbs. O.F. Lees-Hall.
300-lbs. Aluminium bale-out.
120-lbs. brass coke-fired lift-out Cummings.
Polford Sand Sifter, motorised.
"Wizard" Shotblast Barrel, 44 in. × 40 in. diam. with Dust Collector.
Coleman R2. Core Blower.
"Titan" Core Blower, 75-lbs.

**S. C. BILSBY, A.M.I.C.E., A.M.I.E.E., Hainge Road, Tividale, Tipton, Staffs. TIPton 2448.**

## MISCELLANEOUS

REFRACTORY MATERIALS.—Moulding Sand, Ganister, Limestone, Core Gum. Competitive prices quoted.—HUMBALL SAND CO., LTD., Silver Street, Halifax.

MANUFACTURERS of Domestic and Workshop Heating Stoves and similar equipment should contact POTCLAYS LTD., Copeland Street, Stoke-on-Trent; 'phone 48831 for particulars and samples of materials for refractory linings (graded grogs).

ALUMINIUM Foundry near Manchester will give large quantities of aluminium skimmings for quick disposal. Box AF573, FOUNDRY TRADE JOURNAL.

NIMONIC and High Nickel Stainless Scrap available for actual users.—Box NA547, FOUNDRY TRADE JOURNAL.

**ALUMINIUM INGOTS & STICKS**
for deoxidising purposes
**85% to 90% PURITY and 90 % to 95% PURITY**
Prompt delivery - Enquire from
**MITCHAM SMELTERS LTD.**
REDHOUSE RD., MITCHAM RD., CROYDON SURREY
TEL. THOrnton Heath 6101

## MISCELLANEOUS—*contd.*

MANURE, especially suitable for Foundry work and as supplied to the trade for over 30 years. Quotations on request. FRANK GINSTER, Moxley, Wednesbury. 'Phone Wednesbury 0688.

NOW is the time to change your Supplier of Sand. Try Southport Wind Blown Sea Sand for castings, free from shell. Any quantity. Road or Rail.—JOHN LIVESEY (AINSDALE), LTD., Ainsdale, Southport. Telephone: Southport 77489.

BEST Quality Read Sand for improving permeability.—BURY FOUNDRY SAND CO., LTD., Castle Hill Quarries, Bury. 'Phone Bury 854.

**pulverite**
**COAL DUST**
lowest in ash
**The STANDARD PULVERISED FUEL Co. Ltd**
*Head Office:*
**166 VICTORIA STREET, WESTMINSTER, LONDON, S.W.1. Tel.: VICtoria 3121/2/3**

**FOR SALE**
***FIREBOX***
**COPPER SCRAP**
Regular Supplies cut to size
**LEOPOLD LAZARUS Ltd**
WORKS:- ST. STEPHEN'S ST., ASTON, BIRMINGHAM, 6
Tel: Aston Cross 3115

| CITY WALL HOUSE | CHRONICLE BUILDINGS |
|---|---|
| FINSBURY PAVEMENT | CORPORATION ST., |
| LONDON E.C.2 | MANCHESTER, 4 |
| Tel.: MET 8831 | Tel.: BLA 3741 |

## CAPACITY AVAILABLE

MECHANISED FOUNDRY—Malleable and Grey Iron Castings offers 20 tons per week free capacity at early date. Preference for boxes up to 28 in. by 16 in. by 5 in. by 5 in. Snap Flasks up to 14 in. by 14 in. by 3 in. by 3 in. Hand moulding capacity also available. Cast Iron Pipes flanged and specials. Patternmaking facilities if required.—E. J. WALLACE, 50, Wellington Street, Glasgow.

LEWIS' FOUNDRY CO., LTD., Ammanford, has immediate capacity available for Grey Iron Castings weighing from 1 lb. to 15 cwts.; also non-ferrous castings to all specifications.